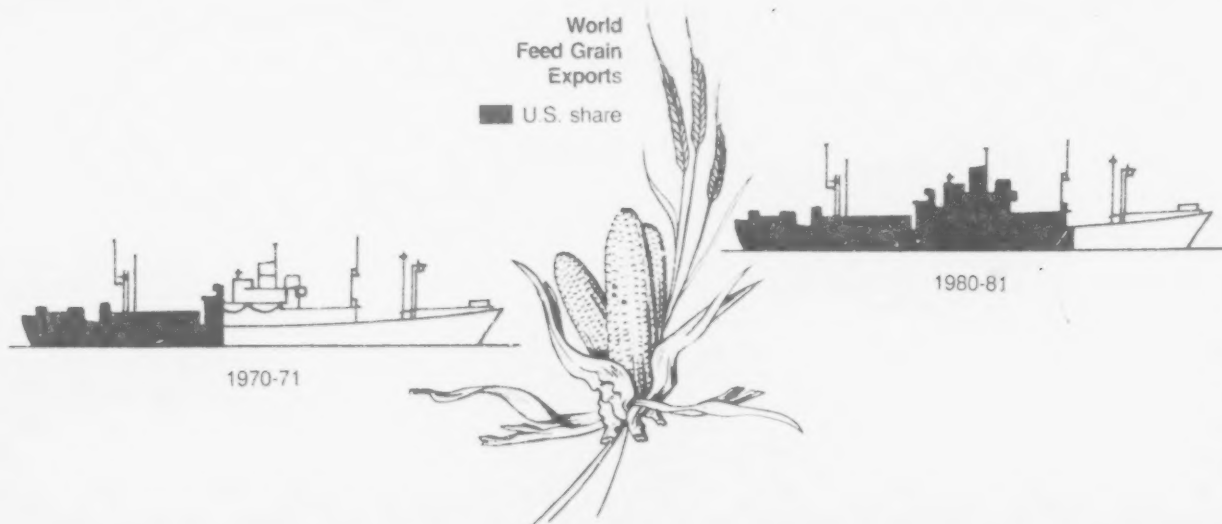


World Food Trade and U.S. Agriculture, 1960-1980



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Abstract

World grain production rose faster than population in the 1960's and 1970's. However, increased consumption of animal products accelerated the growth in world demand for feed ingredients and is holding 1980-81 world grain stocks at low levels despite near-record production. Much of the expansion in feed grain trade has been supplied by U.S. exports, which now account for 69 percent of the world total. U.S. corn exports increased by 371 percent in the last decade along with a doubling of U.S. soybean and soybean meal exports. Further growth of agricultural exports is likely in the 1980's. Global food issues in the years ahead will center around world food reserves, methods of increasing production, financing imports of developing nations,

energy from agricultural products, and trade policies in an era of uncertain supplies.

Key words:

Grain, oilseeds, corn, soybeans, wheat, agricultural exports, global food, world agricultural trade, U.S. trade, trade policies, U.S. trade shares, agricultural imports, grain embargo

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Foreword

World Food Trade and U.S. Agriculture, 1960-1980 is the first of what we expect will be a series of annual reports analyzing patterns of international trade for U.S. agricultural commodities. This first report has examined production, trade and reserves of food and feed grains, including soybeans, because (1) world grain production is used widely as an indicator of the world's food outlook, and (2) regular estimates of world stocks of cereals and predictions of growing conditions influence marketing practices. The authors considered what percentages of U.S. grain crops have entered the world market, what has been the U.S. share of world grain exports, who has bought U.S. grains and what forces have influenced demand for grains in international trade. They also raise several current issues that will determine how future demand for food and feed grains will be met. The issues include food security, financing food imports of developing nations, energy from agricultural products and trade policies in an era of uncertain supplies. Increased investments in agricultural research and education are recommended in order to resolve problems related to these issues. Subsequent reports will update and expand the information presented here and discuss emerging issues affecting world trade patterns.

The World Food Institute of Iowa State University was established in 1972 by the Iowa Board of Regents to focus the university's "competencies and leadership upon the provision of adequate and nutritious food supplies for the world's peoples through research and education." The following objectives have guided development of the Institute's programs:

1. To analyze food and nutrition problems;
2. To generate solutions to food and nutrition problems and to suggest means for implementation of solutions;
3. To build competencies in people for the generation and implementation of solutions of food and nutrition problems;
4. To collect, analyze and disseminate information bearing on food and nutrition problems; and
5. To study interrelationships between the United States (with particular emphasis on Iowa) and other countries of the world.

Five years ago, the World Food Institute sponsored the World Food Conference of 1976 in Ames, Iowa. It brought together natural and social scientists from 70 countries to examine the world food situation and explore potentials and constraints for improving production, distribution and utilization of food. Proceedings of that conference have been distributed widely.

The Faculty Policy Committee of the World Food Institute recommended in April 1980 that an annual report be published to disseminate information on the increasing role of U.S. agriculture in providing food and feed grains for international trade. This publication addresses the fourth and fifth goals of the World Food Institute and extends the Institute's on-campus activities to a wider community of scholars and citizens (producers, consumers, policy-makers) who want to understand the world's food problems and to influence actions to provide an adequate supply of food for everyone. We are deeply grateful to Dr. Robert Wisner, Department of Economics, for his willingness to initiate this series of annual reports and for his dedication to preparing a useful and scholarly analysis.

Charlotte E. Roderuck
Director, World Food Institute
Iowa State University

Summary and Implications

World grain production rose more rapidly than the global population during the last two decades, thus bringing a moderate rise in per capita grain output. However, dietary shifts toward increased consumption of livestock and poultry products have accelerated the growth in world demand for feed ingredients in recent years. With growing demand, world grain stocks as a percentage of annual requirements are near the low point of the mid-1970's.

U.S. agriculture has been called upon to meet much of the growth in world exports of feed grains, soybeans and protein meals, and to a lesser extent in exports of food grains and vegetable oils. In the 1980-81 marketing year, U.S. exports account for 69 percent of the world trade in feed grains, up from only 41 percent a decade earlier. About 78 percent of all unprocessed soybeans traded in world markets originate from the United States. U.S. production from 1 acre out of every 3 is now exported. Earnings from agricultural exports in the 1979-80 fiscal year ending September 30 totaled \$40.5 billion, the equivalent of 29 percent of all cash receipts from U.S. farm marketings. These earnings provide substantial revenue to assist in paying for petroleum and other major U.S. imports.

All signs point to further growth in world demand for farm products in the years ahead, with the most rapid growth likely to be in demand for feed grains and protein meals. Growth in demand for these products has been substantial in most developed and rapidly developing nations and in centrally planned economies. If world grain trade in the decade ahead

continues to expand at the same absolute rate as in the 1970's, annual trade requirements at the end of the decade will be 101 million tons larger than at present. The growth in world trade in the 1980's would be equivalent to 37 percent of the 1980 U.S. grain crop.

Continued expansion of world grain trade at this rate creates a serious challenge for U.S. and world agriculture. Sources of expanded production in the 1970's included increased use of available technology, land clearing and the return of idle U.S. cropland to production. In the years ahead, increased investments in agricultural research and education will be needed to facilitate increased production if export expansion at the rate of the past decade is to be maintained. Demands on agricultural production facilities and stresses on the U.S. livestock industries will be increased further if efforts are made to expand production of agriculturally based motor fuels.

Rising world demand for grain, combined with year-to-year variability of production, will create an increasingly important role for grain reserves in the years ahead. Centrally planned economies appear to be the largest single source of year-to-year variability in world grain production and are one of several factors creating a need for adequate reserve stocks. In an era of supply uncertainty and growing world demand, world trade policies for agricultural products also are likely to be of increasing concern and will include potential impacts from widespread use of bilateral trade agreements.

Introduction

It is a widely known fact that U.S. agriculture plays a key role in meeting world food needs. But the impact from agricultural trade goes far beyond supplying of food to millions living abroad. It includes billions of dollars in U.S. foreign exchange earnings to pay for petroleum, raw materials and other imports vital to the health of the U.S. economy. Export earnings also generate a major portion of the income of American farmers, particularly grain producers. Agricultural exports create jobs for those involved in handling and marketing farm commodities, as well as increased employment in sectors supporting agriculture and agribusiness. While the impact on U.S. consumers often is not well understood, income from farm product exports also plays a major role in supporting the value of the U.S. dollar in world currency markets. Without strong agricultural export markets, the U.S. dollar would be much weaker than at present and would add substantially to the cost of products imported into the U.S. In this way, farm product exports have an important role in holding down inflation in the U.S. economy.

Our purpose here is to provide a current perspective on the world food situation, including trends in world production and demand, and the extent to which progress is being made in meeting world food needs. From this perspective, the role of U.S. exports in world trade will be examined. Questions to be answered include (1) where is the growth in demand for U.S. agricultural exports occurring, (2) what is happening to the U.S. share of world grain exports, (3) what adjustments in trade have occurred as a result of the partial U.S. embargo on grain sales to the Soviet Union, (4) what percentages of our major crops enter world markets, (5) how have these percentages changed in the past two decades and (6) what forces are causing growth in world demand for farm products?

The World Food Situation in 1980-81

World grain production serves as a key indicator of the global food situation, since it is a major influence on both livestock production and on the availability of cereals for direct human consumption.

World grain production in 1980-81 (July-June marketing year) is expected to be the second largest on record, one percent above the previous season but down 2 percent from the record production 2 years ago. From a longer-term perspective, world production is up 30 percent from a decade earlier. At first glance, these percentages might suggest that cereal grains are in plentiful supply this season.

However, a different picture emerges when one looks at projected old-crop carryover stocks expected to remain in storage at the end of the 1980-81 production and marketing year. World stocks are projected to drop to 11.3 percent of annual utilization, slightly above the recent low point in 1975 but well below the 15.3 percent level in 1979. This is equivalent to a 5.9 weeks' supply expected to remain in storage at the end of the season, down from an 8 weeks' supply 2 years ago.¹ Declining world carryover stocks indicate the world grain supply-demand balance is about as tight as in the critically tight years of the

mid-1970's. However, the distribution of world grain shortages is somewhat different than half a decade ago. Tight world grain supplies have important implications for U.S. agricultural exports, grain reserve policies, domestic and foreign livestock industries, farmland values and biomass fuels programs.

Trends in World Grain Production and Consumption

Figure 1 shows the trend in world grain production, consumption and ending stocks as a percentage of utilization during the past two decades. In 1960-61, world wheat,

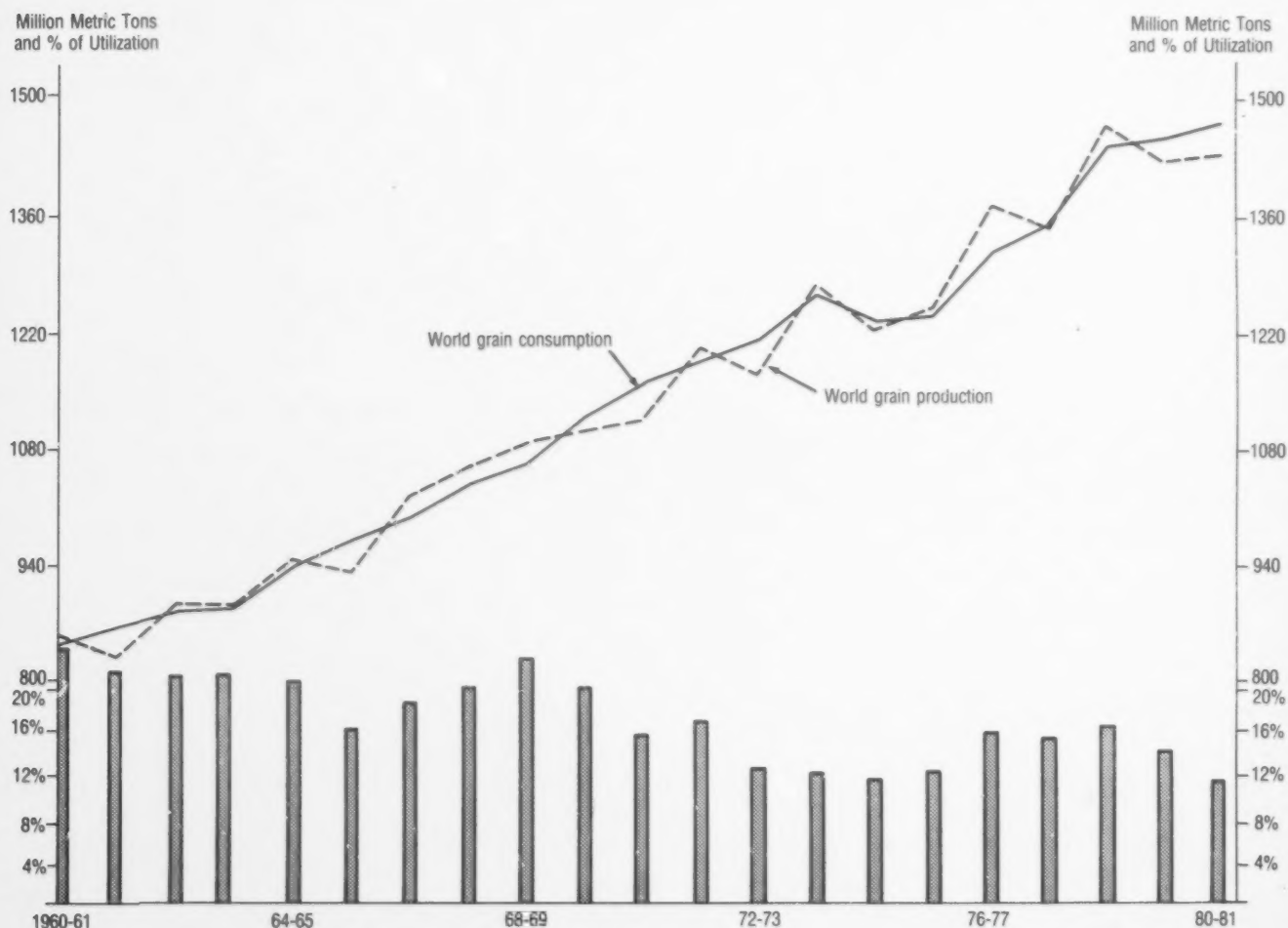


Figure 1. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June, 1960-61 to 1980-81.

Table 1. U.S. and World Ending Grain Carryover Stocks, 1970-71 to 1980-81, in Millions of Metric Tons.^a

Marketing Year	Grain Carryover Stocks ^b			U.S. Stocks as a Percentage of World Carryover
	World ^c	Non-U.S.	U.S.	
1970-71	165.4	110.2	55.2	33
1971-72	183.2	109.4	73.8	40
1972-73	141.7	93.6	48.1	34
1973-74	146.8	115.4	31.4	21
1974-75	132.5	105.0	27.5	21
1975-76	138.1	101.4	36.7	27
1976-77	192.0	130.4	61.6	32
1977-78	191.7	117.2	74.5	39
1978-79	219.6	147.1	72.5	33
1979-80	191.5	113.5	78.0	41
Proj. 1980-81	165.8	108.5	57.3	35

^aSource: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-28-81 (Washington, D.C.), July 14, 1981.

^bIncludes wheat, rice and feed grains.

^cDoes not include complete carryover stocks for Russia, China and certain other centrally planned countries due to lack of published data. Reported total stocks are an aggregate of different marketing years for various countries and thus do not represent inventory levels at a single point in time.

coarse grain and rice production totaled 845 million metric tons. July 1981 projections by the U.S. Department of Agriculture indicate this season's world production will be 1,431 million tons, an increase of 69 percent in two decades.² During this same period, world population grew by 47.6 percent.³ Thus, per capita world grain production and consumption have risen substantially in the past 20 years. Production and consumption have followed nearly identical long-term trends, but with production exhibiting more year-to-year variation than consumption.

Increased per capita consumption occurred as standards of living rose and consumers in industrialized nations altered their dietary patterns to include more meat and livestock products, and reduced direct consumption of cereals. During the years of reduced grain production in the mid-1970's, world per capita grain consumption deviated briefly from its upward trend, as indicated in Figure 1. In those years, livestock herds as well as grain stocks served as a world food reserve. Tight grain supplies and sharply higher feed costs caused a temporary reduction in feeding of grain to livestock and in some areas brought increased slaughter of breeding stock. Increased slaughter temporarily added to consumer meat supplies. In the current season, world livestock producers are facing similar although less severe pressures from tight grain supplies and increased feed costs.

World Grain Carryover Stocks

With declining world carryover stocks, record U.S. grain exports are anticipated in the 1980-81 marketing year. Low carryover stocks also will make grain prices unusually sensitive to 1981 global weather developments. To provide a more detailed perspective on world carryover stocks, Table 1 shows the trend in U.S. and world grain stocks during the 1970's. U.S. stocks clearly served as a major world buffer or reserve supply in the last decade.

In the early 1970's, U.S. carryover stocks represented two-fifths of the world total. With the drought years of the mid-1970's, U.S. stocks were drawn down much more rapidly than stocks in other parts of the

world, thus substantially lowering the U.S. share of world grain carryover stocks. When world production recovered to more favorable levels at the end of the decade, the U.S. carryover rose more rapidly than foreign stocks and in effect temporarily replenished world grain reserves. In 1980-81, the U.S. share is again declining moderately as other nations draw heavily on American reserve stocks. By the end of the current marketing year, U.S. grain stocks are expected to be only modestly above minimum trade needs for normal feeding, processing and merchandising activities. If major crop failures should occur in 1981-82, significant reductions in world feeding of grain to livestock and/or non-U.S. grain stocks would be required. In that case, costs of grain both for livestock feeding and direct human consumption would likely rise substantially.

Table 2 shows world wheat and coarse grain stocks separately in millions of tons and percentages of annual utilization during the 1970's. Because of greater importance for direct human consumption, the world historically has held substantially larger reserves of wheat than coarse grains (or feed grains)—when expressed as a percentage of annual requirements. World wheat carryover stocks varied from 17 to 26 percent of annual utilization in the 1970's, while coarse grain stocks ranged from 9 to 14 percent of utilization. Coarse grains consist of corn, oats, barley, sorghum and rye, and are used primarily for livestock feeding. While the largest use of wheat is for direct human consumption, substantial quantities of wheat often are fed to livestock, with the quantity fed depending on the cost and availability of coarse grains. If feed grains are in short supply, feeding of wheat tends to increase. For the 1980-81 marketing year, world wheat carryover stocks (as a percentage of annual requirements) are projected to drop slightly below the recent

Table 2. World Wheat and Coarse Grains Carryover Stocks, 1970-71 to 1980-81.^a

Marketing Year	Mil. Met. Tons Wheat Carryover	Percentage of Annual Utilization	Mil. Met. Tons Coarse Grains Carryover	Percentage of Annual Utilization
1970-71	74.1	21.9	72.2	12.2
1971-72	81.1	23.7	85.8	13.9
1972-73	62.6	17.3	68.2	10.8
1973-74	70.4	19.3	63.5	9.4
1974-75	63.9	17.6	57.3	9.0
1975-76	62.8	17.9	56.7	8.8
1976-77	98.8	25.7	75.6	11.0
1977-78	84.0	21.1	84.1	12.1
1978-79	100.8	23.4	90.7	12.1
1979-80	79.2	17.8	89.1	12.0
Proj. 1980-81	72.7	16.3	70.5	9.5

^aSource: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-28-81 (Washington, D.C.), July 14, 1981, p. 24.

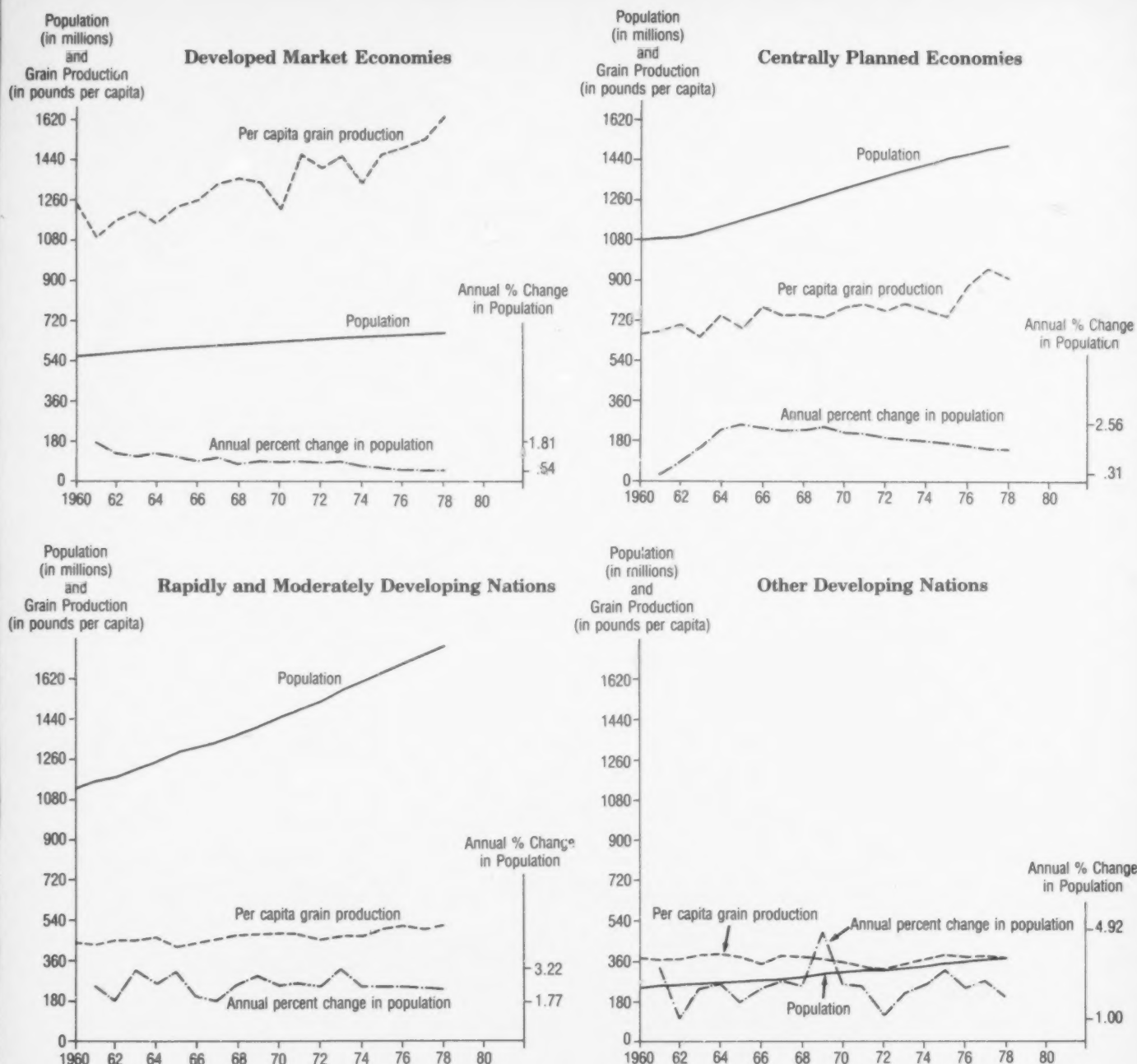


Figure 2. Trends in Population, Population Growth Rates and Per Capita Grain Production by Economic Groupings of Nations, 1960-1978.

low point at the end of the 1972-73 marketing year and coarse grains are expected to be only slightly above the 1975-76 low point.

Trends in World Grain Production and Population by Economic Sub-Classes

To get a clear picture of the world food situation, one needs to look beyond aggregate production and population data to determine what areas are making progress in meeting their food needs and what areas—if any—are lagging behind. Figure 2 shows yearly changes in grain

production and population during the past two decades in (1) developed market economies, (2) centrally planned economies, (3) rapidly and moderately developing nations and (4) other developing countries.⁴ The developed market economies include the United States, Canada, Japan, Australia and most of Western Europe. For these nations, the yearly growth rate in population has trended downward for two decades, declining from a 1.75 percent growth rate in 1961 to approximately a 0.5 percent annual growth rate in the late 1970's. The yearly expansion in grain production in this group averaged 2.7

percent over the past 20 years, generating a substantial increase in per capita grain production. In fact, the developed market economies were the highest of the four economic groups in growth rate of per capita grain production during the 1960-1978 period.

Centrally planned economies ranked second in growth of per capita grain production in the last two decades, with grain production rising by an average of 3.4 percent per year and population growing at an average annual rate of 1.9 percent. Centrally planned economies experienced a more

Table 3. Frequency of Year-to-Year Increases and Decreases in Total Grain Production by Economic Groupings of Nations, 1960-61 through 1979-80.

Economic Grouping	Number of Years Production		Extreme Range in Production (Mil. Metr. Tons) ^a	Statistical Variance of Grain Production ^b
	Increased	Decreased		
Developed Market Economies ^c	13	5	221.7	.028
Centrally Planned Economies	11	8	312.3	.043
Rapidly-Moderately Developing Nations	15	4	189.4	.038
Other Developing Nations ^c	12	6	22.5	.022

^aDifference between highest and lowest production during the 19-year period.

$$^b\text{Calculated as } \hat{\sigma}^2 = \frac{\sum_{i=1}^n (y_i - \bar{y})^2}{n-1}$$

^cIn one year, production in this group remained unchanged from the previous year.

rapid growth in grain production than the "developed market economies" group, but a substantially higher population growth rate held down the growth in per capita production. This group includes the Soviet Union, China, Eastern Europe, Cuba and a few other Asian nations.

Rapidly and moderately developing countries achieved the second highest annual average growth in grain production in the 1960-78 period, with an average growth of 3.3 percent per year. However, with a rapid 2.5 percent annual population growth rate, per capita grain production rose less rapidly than in either developed market economies or centrally planned countries. This group includes most Middle East and North African nations, Spain, Portugal, Greece, India, Pakistan, Republic of Korea, Taiwan, Thailand, the Philippines and a large number of Latin American countries.

The "other developing nations" experienced a considerably slower rate of growth in grain production than the first three economic categories, with an average annual increase of 2.3 percent. With population growing at 2.5 percent annually, per capita grain production declined slightly in this group during the 1964-78 period. The "other developing countries" category includes much of Africa

and Oceania, Burma, Bangladesh and Afghanistan.

Figure 2 shows a pronounced slowing of the population growth rate in developed market economies during the 1960's and 1970's and a modest downward trend in population growth rate in centrally planned countries, but no definite trend in population growth rates of the rapidly and moderately developing nations.

Table 3 summarizes the year-to-year variation in grain production by economic classification. Centrally planned economies showed the highest frequency of year-to-year declines in total grain production, with such years occurring on 8 occasions, or 44 percent of the time, in the past 19 years.

The rapidly and moderately developing group had the lowest frequency of year-to-year declines in grain production, with yearly gains in output occurring 79 percent of the time during the period being examined here. These data indicate variability of crop production in centrally planned economies has had a greater destabilizing influence on the world grain economy than crop variability in any of the other three economic groups of nations. Variability of grain production in developed market economies also contributed

substantially to year-to-year fluctuations in grain supplies.

Shares of world grain production and population represented by each of the four economic groupings are shown in Table 4. The developed market economies contain 16 percent of the global population but produce one-third of the world grain crop. As one would expect, most major grain exporting nations are found in this economic classification.

Rapidly and moderately developing nations account for one-fourth of all grain production and nearly 42 percent of the world's population. This group is a substantial importer of grains, but remains below the centrally planned nations in total import volumes.

World Grain Production and Trade Prospects, 1980-81

World grain supplies appear to be about as tight in 1980-81 as 6 years earlier, when widespread concern about serious world food shortages was being voiced. Current tight supplies reflect a disappointing world grain harvest as well as continued growth in world grain utilization. Serious crop problems in 1980-81 were concentrated primarily in four areas: the United States, the Soviet Union, Australia and China.

Table 4. Shares of World Grain Production and Population in 1979, and Grain Production per Person by Economic Grouping of Nations.

Economic Grouping	Grain Production, Millions of Metric Tons	Percentage of World Grain Production	Population, Millions of Persons	Percentage of World Population	Grain Production, Metric Tons per Person
Developed Market Economies	503.7	33.2	661.8	15.6	.761
Centrally Planned Economies	563.5	37.1	1,437.5	33.9	.392
Rapidly-Moderately Developing Nations	390.9	25.7	1,766.3	41.7	.221
Other Developing Nations	61.2	4.0	373.5	8.8	.164
World Total	1,519.3	100	4,239.1	100	.358

Table 5. Combined World Total Wheat and Coarse Grain Production in 1980-81 and in Selected Major Producing Regions.^a

Country or Region	Est. Production, 1980-81	Percent Change From	
	Mil. Metr. Tons	1978-79	1979-80
United States	263.2	- 3	-11
Soviet Union	178.8	-21	+ 4
China	136.7	+ 3	- 6
Australia	16.1	-36	-28
Sub-total	594.8	- 9	- 6
Western Europe	159.0	+ 4	+ 9
Eastern Europe	96.2	-0.2	+ 6
All others	315.3	+ 6	+ 9
Sub-Total	569.3	+ 4	+ 8
World Total	1,165.3	-3.0	+0.3

^aSource of Data: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-28-81 (Washington, D.C.), July 14, 1981.

Table 6. Rice Production by Major Producing Countries and World Total, 1978-79 through 1980-81, in Millions of Metric Tons.^a

Country or Area	1978-79	1979-80	Prelim. 1980-81	1980-81 Percent Change
				From 1979-80
China	137.0	143.7	139.3	- 3
India	80.7	63.3	81.1	+28
Indonesia	25.8	24.7	29.8	+21
Bangladesh	19.3	19.1	20.9	+ 9
Japan	15.7	14.9	12.2	-18
Thailand	17.5	15.7	18.5	+18
Vietnam	9.9	10.7	10.0	- 7
Brazil	7.6	9.6	9.1	- 5
Korea, Rep. of	7.6	7.9	5.5	-30
U.S.	6.0	6.0	6.6	+10
Others	58.1	59.7	62.9	+ 5
World Total	385.2	375.3	395.9	+ 5.0

^aSource of Data: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-28-81 (Washington, D.C.), July 14, 1981.

Table 7. Total Wheat and Feed Grain Utilization and Imports by Major World Areas in 1980-81.^a

Area	1980-81	Percent Change in		1980-81	Percent Change in	
	Preliminary	Utilization From		Preliminary	Imports From	
	Utilization Estimate, Mil. Metric Tons	1976-77	1979-80	Import Esti- mate, Mil. Metric Tons	1976-77	1979-80
Soviet Union	214.5	+ 3	- 1	33.5	+225	+10
Western Europe	163.7	+ 6	+ 0.5	29.0	- 30	- 6
Eastern Europe	111.6	+ 8	+ 7	16.3	+ 7	- 6
China	151.4	+22	- 3	14.7	+374	+35
United States	169.3	+11	- 7	--	--	--
Others	379.8	+16	+ 5	104.5	+ 38	+ 7
World Total	1,190.3	+11	+ 0.3	198.0	+ 36	+ 6

^aSource of Data: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-20-81 (Washington, D.C.), May 13, 1981.

Table 8. World, U.S. and Foreign Production of Oilseed Products in 1970-71, 1979-80 and 1980-81.^a

	44% Protein Meal Equivalent (Mil. Metr. tons)				Fat and Oil Production (Mil. Metr. tons)			
	1970-71	1979-80	Prelim. 1980-81	% Change 1970-80	1970-71	1979-80	Prelim. 1980-81	% Change 1970-80
U.S.	25.2	50.1	39.8	+58	10.4	17.3	14.3	+38
Non-U.S.	30.3	45.9	47.7	+57	32.0	41.0	42.6	+33
World Total	55.5	95.9	87.5	+58	42.4	58.3	56.9	+34

^aSource: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 16-78 (Washington, D.C.), November 1978, and FOP 11-81 (Washington, D.C.), June 1981. Totals may not add due to rounding of decimals.

Wheat and Coarse Grains

Combined production of wheat and coarse grain in these four countries, as shown in Table 5, dropped 6 percent below the previous season and 9 percent below the level of 2 years earlier. Most other major world grain-producing regions had record or near-record 1980-81 grain harvests. The 1980-81 West European grain crop set a new record at 9 percent above the preceding year, along with near-record production in Eastern Europe. Combined wheat and coarse grain production in 1980-81 in all other countries also established a new record, according to preliminary estimates by the U.S. Department of Agriculture.

Based on these regional patterns of production, strong 1980-81 import demand for grain was concentrated more heavily in Russia and China than in other areas because of the short-fall in their 1980 production. In a world setting, however, strong demand for grain in these areas immediately affects the cost and availability of grain to other areas, and has placed upward pressure on 1980-81 world grain prices. Also, reduced production in the United States was only partially offset by large carryover stocks of grain from previous crops. With reduced total U.S. supplies, record 1980-81 grain exports are being achieved only through a decrease in U.S. grain feeding.

Rice

World production of rice, the other major cereal crop, reached a record high in 1980-81, as shown in Table 6. Production

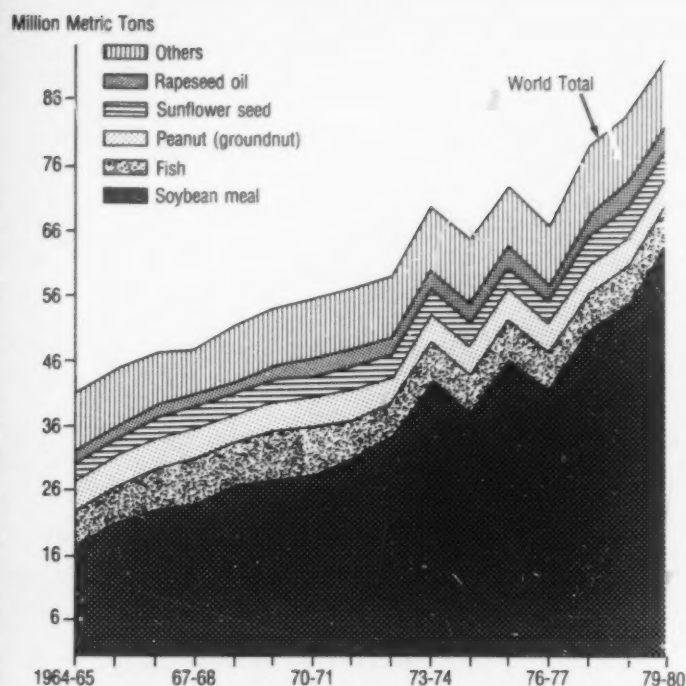


Figure 3. World Protein Meal Production by Type of Product, 1965-80.

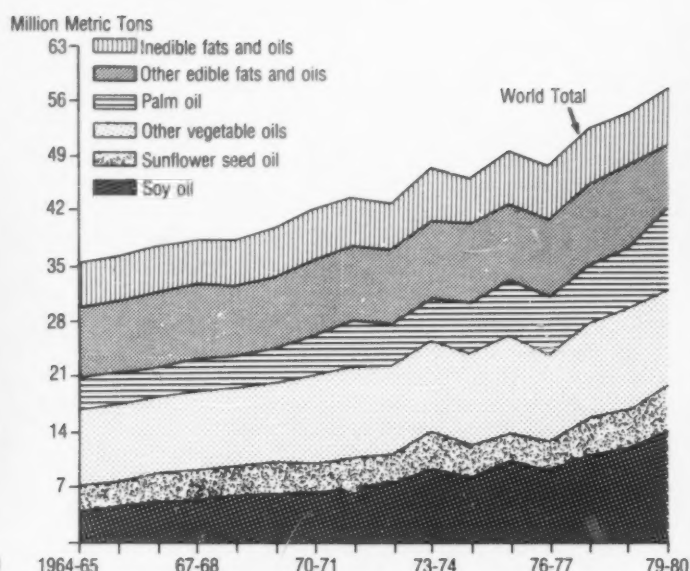


Figure 4. World Edible and Inedible Oil Production by Type of Product, 1965-1980.

increased in most major producing countries except Japan, Brazil, Vietnam, China and the Republic of Korea. In Japan, the reduced production was due in part to large carryover stocks and government incentives to divert farmland from rice to other crops. The record world rice crop more than offset reduced production of other grains, thus pushing total world grain production one percent above the previous marketing year.

Grain Utilization and Imports

To complete the 1980-81 aggregate world grain picture, Table 7 shows estimated utilization and imports of grain in key producing and consuming areas. Grain utilization in Russia, China and the United States is expected to be slightly reduced from the 1979-80 season, while utilization is continuing its long-term upward trend in most other areas. Even in countries experiencing adverse weather and reduced grain production last year, utilization will be moderately higher than 4 years ago. Global grain imports in 1980-81 are expected to be about 6 percent above the July-June 1979-80 marketing year and 36 percent above 1976-77, with increased imports indicated for most major areas except Europe. These developments reveal a strong upward trend in world grain imports and consumption that continued into the 1980-81 season despite world grain prices which were well above recent years. Strong world demand is expected to generate record U.S. farm product exports in the 1980-81 fiscal year ending September 30.

World Oilseed Production

World protein meal, fat and oil supplies are slightly tighter than last season as a result of growing demand and reduced 1980 oilseed production in the United States and the Soviet Union. From a longer-term perspective, world production of both protein meal and fats and oils is sharply above a decade ago and has substantially outpaced world population growth. Table 8 shows U.S., foreign and world production of protein meal and fats and oils in 1970-71, 1979-80 and 1980-81. Protein meal production expanded by over 50 percent in both the U.S. and foreign producing areas during the past decade. Fat and oil production expanded more slowly but still increased by about one-third during the decade, with U.S. production slightly exceeding the foreign growth rate.

Figures 3 and 4 show the sources of growth in world oilseed product production during the decade by type of product. In protein meals, soybean meal accounted for most of the growth in production during the 1970's. World fishmeal output declined modestly,

while production of other major protein meals expanded only slightly. In 1980-81, soybean protein will account for about two-thirds of the world's production of protein meal. In contrast to the protein complex, production of most non-soy oils expanded substantially during the 1970's along with a sharp increase in world soybean oil production. For the 1980-81 marketing year, soybean oil is expected to account for 22 percent of the total world fat and oil production.

World Area Devoted to Grain and Oilseed Production

Area devoted to world oilseed production has expanded more rapidly in recent years than the world grain area. As shown in Table 9, world cropland devoted to major oilseeds in 1980-81 is estimated at 129 million hectares, 14 percent above the 1972-76 average level. World grain area is more than five times as large as the area devoted to major oilseeds. However, total cropland devoted to grain has expanded much more slowly than oilseed area in recent years.

Table 9. World Area Devoted to Grains and Major Oilseeds, 1972-1976 Average and 1980-81 in Millions of Hectares.^a

Crop	1972-76 average	Preliminary 1980-81	% Change from 1972-76 average
All Grains	701.3	721.1	+ 3
Major Oilseeds	113.4	129.0	+ 14

^aSource: U.S. Department of Agriculture, Foreign Agriculture Service, *Foreign Agriculture Circular, Grains*, FG-28-81 (Washington, D.C.), July 14, 1981, and *Foreign Agriculture Circular, Oilseeds and Products*, FOP 17-79 (Washington, D.C.), September 1979, and FOP 11-81 (Washington, D.C.), June 1981.

Role of U.S. Agricultural Exports in World Trade

U.S. agricultural exports dominate world trade in a number of important products, and in some cases the degree of dominance is substantially greater now than a decade or two ago. Dominant shares of trade do not indicate the U.S. has a monopoly in world markets. Competition in exports of major farm products remains keen, with domestic production in importing countries being part of that competition. However, dominant trade shares do indicate changes in U.S. supply and demand conditions have a major impact on the quantity of grain available to enter world markets. In that way, U.S. market conditions and government policies affect agriculture around the globe. Growing world trade also causes U.S. agriculture to be increasingly linked to world weather, economic and political developments.⁵

U.S. Share of World Feed Grain Exports

Preliminary estimates indicate 69 percent of the world's 1980-81 coarse grain exports are originating in the United States. Ten years earlier, the U.S. share of the world coarse grain trade was only 41 percent; in 1963-64, it was 46 percent. The sharp rise in the U.S. share of world trade occurred as foreign nations increased their total coarse grain exports by only 15 percent between 1970-71 and 1980-81, despite growing world demand.⁶ In effect, the task of supplying a large and growing world feed grain trade has been assigned mainly to U.S. farmers.

While U.S. exports hold a dominant share of world coarse grain trade, they play a much smaller but significant and growing role in world coarse grain consumption. U.S. coarse grain exports are expected to account for 10 percent of the world coarse grain consumption in 1980-81, up from 3.2 percent a decade earlier.⁷

U.S. Share of World Food Grain Exports

U.S. dominance in world wheat trade increased modestly in the last decade, but at a much slower rate than in feed grains. The United States' share of world wheat exports in 1980-81 is estimated at 44 percent, up from 37 percent 10 years earlier. In contrast to feed grains, foreign exports of wheat rose sharply during the 1970's, with 1980-81 exports running 51 percent higher than a decade earlier. U.S. wheat exports approximately doubled in the same period in response to growing

world demand. U.S. wheat exports will account for about one-tenth of the world's wheat consumption in 1980-81, up from 6 percent in 1970-71.⁸

The United States is a relatively minor producer of rice, accounting for less than 2 percent of world production. However, it is one of the world's two largest rice exporters, and the U.S. share of world rice trade has been trending upward. U.S. rice exports in calendar year 1981 are expected to account for 1 ton out of every 4 traded in world markets. A decade ago, the U.S. share of world rice trade was 17 percent.

U.S. Share of World Soybean and Soybean Product Exports

American exports of soybeans are even more dominant in world trade than other major farm products. U.S. exports in 1980-81 are expected to account for 78 percent of all unprocessed soybeans traded in world markets. However, that's a decline from the 94 percent share U.S. soybean exports held in 1970-71.⁹ The decline in U.S. share of world trade reflects sharply expanded soybean production in South America in the 1970's. Growing output of soybeans in South America had an even more dramatic effect on the U.S. share of processed soybean product exports. The U.S. share of world trade in processed soybean meal dropped from 87 percent in 1970-71 to an estimated 35 percent this season. Its share of soybean oil exports dropped from 96 percent in 1970-71 to an estimated 24 percent in 1980-81. Despite the declining market share, rapid growth in world demand has pushed 1980-81 U.S.

soybean product exports well above a decade earlier.

Long-Term Trend in World Grain Trade

World trade in grains increased at an accelerating rate in the 1970's in response to rapid economic growth, an expanding world population and increased consumption of livestock and poultry products. During the decade, combined world exports of wheat, rice and coarse grains rose at an annual average rate of 10.2 million metric tons, as shown in Table 10. In 8 out of the 10 years, world grain trade increased, with only one year recording a decline and with trade holding constant in the remaining year. Thus, world grain trade trended almost steadily upward during the past decade.

In contrast, growth in world grain trade in the 1960's was much slower and more erratic. Trade increased 5 years out of 10, but decreased substantially in the other 5 years. The average growth in total world grain trade for the decade was 3.7 million metric tons per year, only about one-third as large as in the 1970's.

To put the growth rate of the 1970's in perspective, if it continues at the same absolute rate in the 1980's, annual world grain trade at the end of the decade would be 101 million metric tons larger than at present. This growth in world trade would be equivalent to 37 percent of the 1980 U.S. grain production. Clearly, the world and U.S. agriculture face a major challenge in supplying enough grain to meet the steady upward trend in world trade.

Table 10. Annual Change in Total World Grain Trade, 1961-62 through 1980-81, in Millions of Metric Tons.^a

Marketing Year	Change from Previous Year in Total Trade	Marketing Year	Change from Previous Year in Total Trade
1961-62	+ 11.0	1971-72	0
1962-63	- 1.2	1972-73	+ 24.6
1963-64	+ 15.5	1973-74	+ 8.1
1964-65	- 2.8	1974-75	- 6.6
1965-66	+ 15.7	1975-76	+ 16.4
1966-67	- 7.3	1976-77	+ 3.8
1967-68	- 6.5	1977-78	+ 10.5
1968-69	- 7.8	1978-79	+ 7.5
1969-70	+ 7.8	1979-80	+ 25.4
1970-71	+ 12.8	Prelim. 1980-81	+ 12.4
Average Yearly Change	+ 3.7		+ 10.2

^aSource: Compiled from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-25-81 (Washington, D.C.), June 15, 1981.

Impact of Trade on U.S. Agriculture

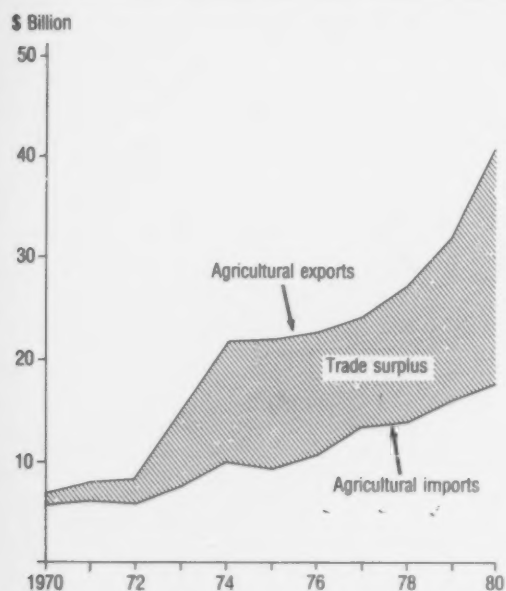


Figure 5. Dollar Value of U.S. Agricultural Exports and Imports, 1970-1980.

There are numerous ways the importance of trade to U.S. agriculture can be illustrated. For example, earnings from U.S. agricultural exports in the 1979-80 fiscal year ending September 30 totaled \$40.5 billion.¹⁰ That's equivalent to 29 percent of the cash receipts from U.S. farm marketings, although not all of these export earnings return to producers. A portion of the total is used to cover the costs of handling, transporting and other expenses involved in getting farm products from producing areas to port locations. Production from approximately 1 out of every 3 harvested acres in the U.S. moves into world markets, with the extent of dependence on exports varying from one crop to another.¹¹

In the 1979-80 fiscal year, U.S. agricultural imports totaled \$17.3 billion, leaving a record net surplus in U.S. agricultural trade of \$23.2 billion. As Figures 5 and 6 illustrate, the net surplus in U.S. agricultural trade has expanded sharply in recent years, partially offsetting a sharp deterioration in the U.S. non-agricultural trade balance.¹² Thus, farm product exports are playing an important role in helping to pay for the nation's large imports of petroleum and other raw materials. As Figure 7 illustrates, only a small percentage of U.S. agricultural exports are

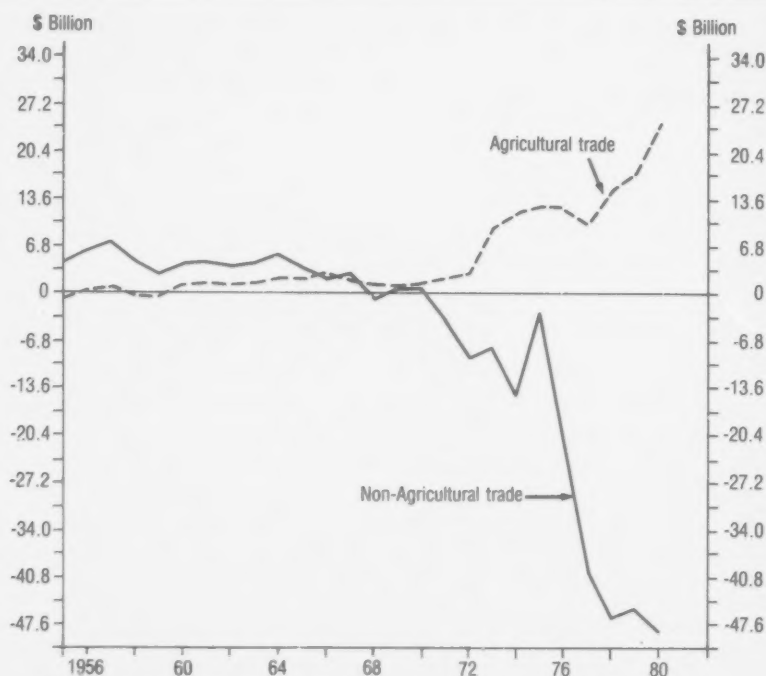


Figure 6. Net U.S. Trade Balance in Agricultural and Non-Agricultural Products by Calendar Years, 1956 through 1980.

Sources: U.S. Department of Agriculture, Economics and Statistics Service, *U.S. Foreign Agricultural Trade Statistical Report, Calendar Year 1979* (Washington, D.C.), October 1980, and U.S. Department of Agriculture, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January/February 1981.

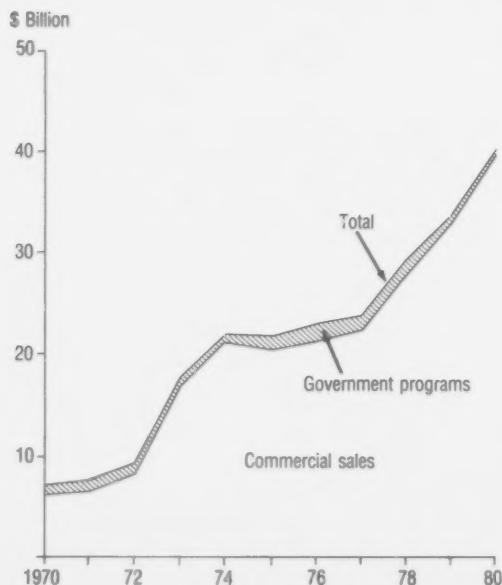


Figure 7. Dollar Value of U.S. Agricultural Exports Under Government Programs and Commercial Sales, 1970-1980.

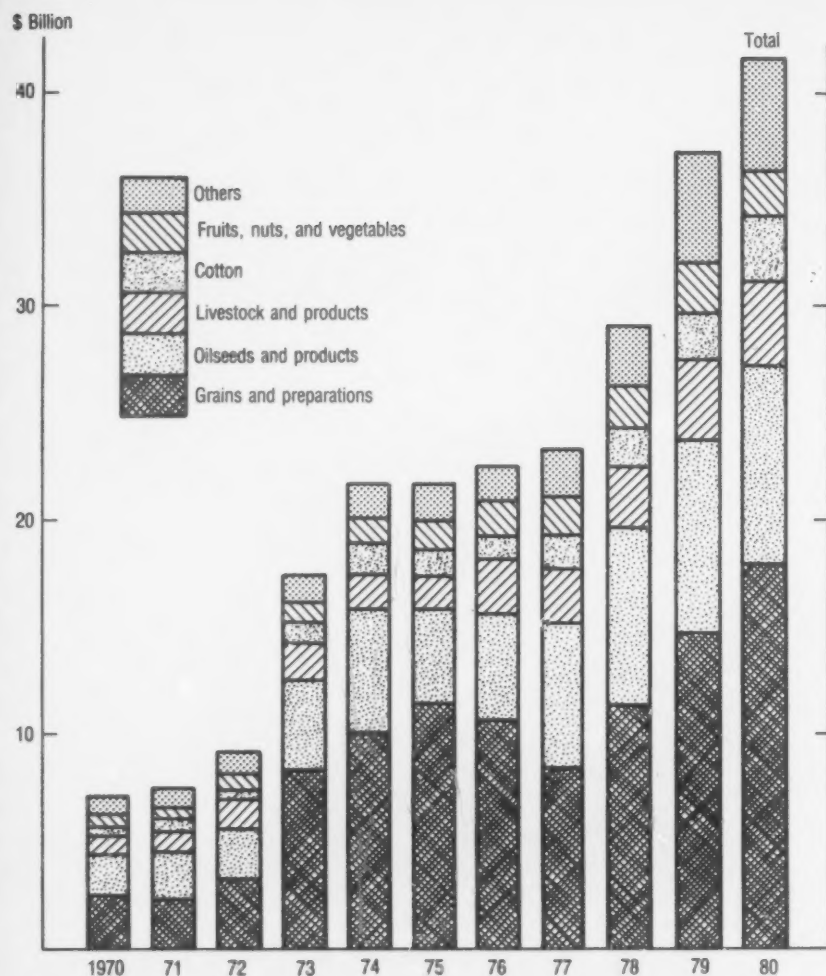


Figure 8. Value of U.S. Agricultural Exports by Commodity, 1970-1980 Calendar Years.

Table 11. Composition of U.S. Agricultural Exports by Type of Commodity, 1977-78 through 1979-80.*

Commodity Group	October-September Fiscal Years			Percentage of 1979-80 Total Exports
	1977-78	1978-79	1979-80	
	(\$Bil. \$)			
Feed grains	5.75	6.66	9.17	22.7
Oilseeds	5.26	5.99	6.79	16.8
Oilseed meal	1.18	1.41	1.72	4.2
Vegetable oils	0.96	1.09	1.24	3.1
Wheat and wheat products	4.14	4.86	6.63	16.4
Rice	0.87	0.88	1.17	2.9
Meat and meat products	0.69	0.84	0.87	2.1
Hides and skins	0.82	1.30	1.12	2.8
Dairy products	0.16	0.12	0.16	0.4
Poultry and poultry products	0.33	0.37	0.55	1.4
Other animals and animal products	0.83	1.01	1.07	2.6
Cotton	1.71	1.91	3.03	7.5
Fruits, vegetables and nuts	2.72	3.20	4.26	10.5
Tobacco	1.13	1.29	1.35	3.3
Others	0.76	1.03	1.35	3.3
Total	27.31	31.96	40.48	100

*Sources: U.S. Department of Agriculture, Economics and Statistics Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November 1979 and November/December 1980.

financed by government aid programs. More than 90 percent of U.S. farm product exports in recent years have been commercial sales. The largest users of government export assistance programs are wheat, wheat flour, rice and vegetable oils.¹³

Value of U.S. Farm Product Exports by Commodity Groups

Grains, oilseeds and oilseed products make up about two-thirds of the total dollar value of U.S. agricultural exports, as shown in Figure 8 and Table 11. During the 1977-78 through 1979-80 period, U.S. exports of these commodities grew in value by 47 percent. Combined exports of livestock, meat, dairy and poultry products accounted for 9 percent of the value of agricultural exports in fiscal 1979-80. These exports grew in value by one-third during the past 2 years. An additional one-fifth of the value of U.S. agricultural exports comes from cotton, tobacco, fruits, vegetables and nuts.

Share of Major U.S. Crops Exported

As illustrated in Figure 9, exports now are most important for wheat, cotton, soybeans and corn in that order. Nearly two-thirds of the total demand for U.S. production of the first three crops now comes from foreign

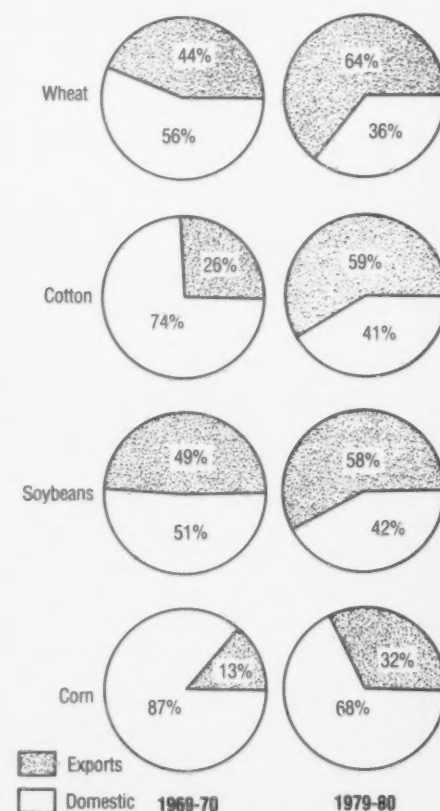


Figure 9. Percentages of Major U.S. Crops Used Domestically and Exported, 1969-70 and 1979-80 Marketing Years.

markets. Exports last season accounted for one-third of the total demand for the U.S. corn crop, with the export share being up sharply from a decade ago.

U.S. Agricultural Imports

For trade to occur over the longer term, a two-way exchange between nations is necessary. To obtain foreign exchange for use in purchasing U.S. exports, other nations must sell their products in world markets. With this two-way exchange, trading partners tend to concentrate on production and export of those products in which they have a comparative advantage. They often expand domestic supplies of other products through imports that can be produced more economically by their trading partners.¹⁴ While the value of U.S. agricultural imports is far below its exports, the U.S. does import some farm products as a result of this principle of comparative advantage.

As Table 12 indicates, nearly one-half of all U.S. agricultural imports are products not produced in significant volumes in the United States because of climatic limitations. Included in this group are coffee, cocoa, bananas, rubber, tea and silk. These imports are considered complementary since they do not directly compete with U.S. domestic production.

Supplementary imports are those which compete with domestic farm products. Livestock and livestock products are the most important component of this category and account for about one-fifth of all U.S. agricultural imports. Other major imports in order of importance are sugar and related products, fruits and vegetables, alcoholic beverages, oilseeds and oilseed products. A small volume of grains and feeds is imported into the U.S., primarily due to Canadian marketings in border states. While the U.S. is a large net exporter of oilseeds, the principle of comparative advantage generates modest imports of coconut oil, palm oil and related oilseed products originating in southeastern Asia and the Philippines. Also, limited Canadian and Mexican marketings of oilseeds sometimes occur in border states.

Trends in U.S. Corn and Feed Grain Exports by Destination

Most overseas shipments of U.S. corn are destined for industrial economies.¹⁵ There it is used largely as a livestock feed to meet growing consumer demand for animal and poultry products. As Figures 10 and 11 indicate, foreign demand for U.S. corn and total feed grains literally exploded upward beginning in 1972-73 after a gradual upward trend during the previous decade. Total U.S. corn exports rose by 371 percent during the 1970-71 to 1979-80 period, along with a 276 percent increase in combined exports of all U.S. feed grains. Rapid growth in demand for U.S. corn in the

Table 12. Value of U.S. Agricultural Imports in 1975-76 and 1979-80 October-September Fiscal Years by Commodity Groups.*

Product	1975-76	1979-80	Percent Chg. 1975-76 to 1979-80
(Millions of \$)			
Complementary Imports:			
Cocoa and chocolate	595	969	+ 63
Coffee	2,391	4,493	+ 88
Rubber	484	818	+ 69
Tea	89	133	+ 49
Bananas and plantains	264	420	+ 59
Drugs	108	151	+ 40
Others	278	367	+ 32
Total complementary imports	4,209	7,351	+ 75
Supplementary Imports:			
Dairy products	256	462	+ 80
Hides and skins	200	227	+ 14
Meat and meat products, excluding poultry	1,435	2,277	+ 59
Poultry and poultry products, excluding eggs	88	75	- 15
Other animal products and animals	326	670	+ 106
Total animals and animal products	2,305	3,711	+ 61
Fruits, nuts, vegetables and products	876	1,653	+ 89
Sugar and products	1,347	1,843	+ 37
Alcoholic beverages	432	1,035	+ 140
Oilseeds and products	539	617	+ 14
Grains and feeds	229	377	+ 65
Tobacco	279	402	+ 44
Others	298	311	+ 4
Total supplementary imports	6,325	9,949	+ 58
Total agricultural imports	10,514	17,300	+ 65

*Source: U.S. Department of Agriculture, Economics and Statistics Service, *Foreign Agricultural Trade of The United States* (Washington, D.C.), November/December 1980 and November 1977.

early part of the decade was concentrated in Western Europe and Japan, along with the addition of the Soviet Union as a significant new foreign market. In the middle and latter parts of the decade, the Republic of Korea, Eastern Europe and a few Western Hemisphere countries also emerged as sizeable outlets for the U.S. corn crop.

During the 1970's, the Soviet Union and China (in the "others" category in Figure 10) became highly variable sources of demand for U.S. feed grains. Soviet purchases fluctuated from 5.2 million metric tons in 1973-74 to 1.3 million the following season to 9.9 million in 1975-76, then back to 4.6 million in 1976-77. China emerged as a modest purchaser of U.S. corn in 1973-74, although its purchases dropped to zero in the immediately following years, until 1977-78. The Middle East oil exporting countries remain only minor importers of U.S. corn and are approximately comparable to Eastern Europe in the mid-1960's or the Republic of Korea as recently as the mid-1970's.

At this writing, there is no evidence of a slowing in the growth rate of U.S. corn exports. If the absolute growth rate of the last decade continues in the 1980's, U.S. corn exports in 1990-91 would be 52 million metric tons above the current level. That represents an increase equivalent to 31 percent of the 1980 U.S. corn crop. With most readily available U.S. cropland now in production, U.S. agriculture faces a major challenge in meeting growing world demand. If it fails to meet the challenge, U.S. livestock production likely will be reduced substantially and world consumers will face accelerated increases in costs of animal products.

Trends in U.S. Soybean and Soybean Product Exports by Destination

As one would expect, major destinations for U.S. soybean and soybean meal exports are similar to those for corn and all feed grains. These products are major protein feed ingredients for the world livestock and poultry industries. Hence, they are exported largely to industrial economies

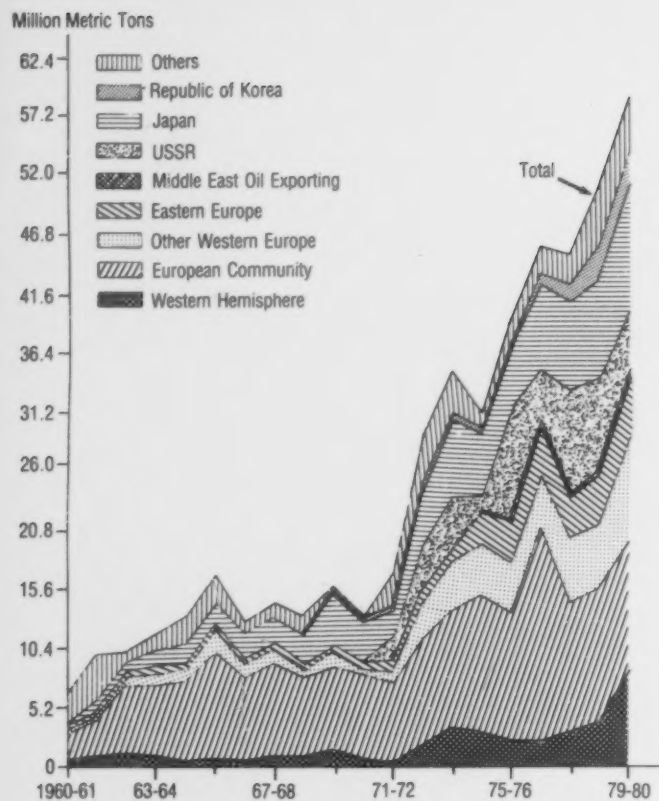


Figure 10. U.S. Corn Exports by Destination, October-September, 1960-61 to 1979-80.

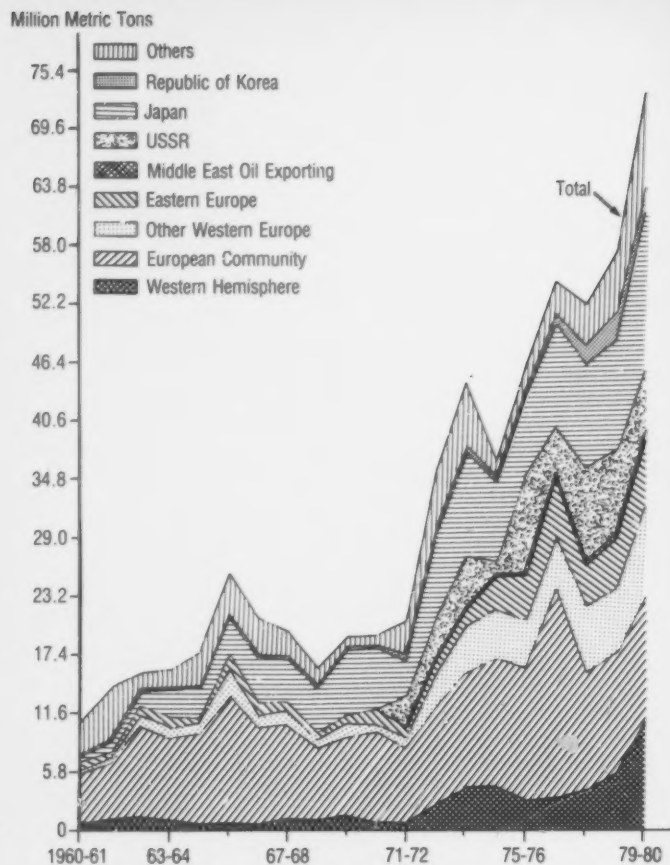


Figure 11. U.S. Coarse Grain Exports by Destination, October-September, 1960-61 to 1979-80.

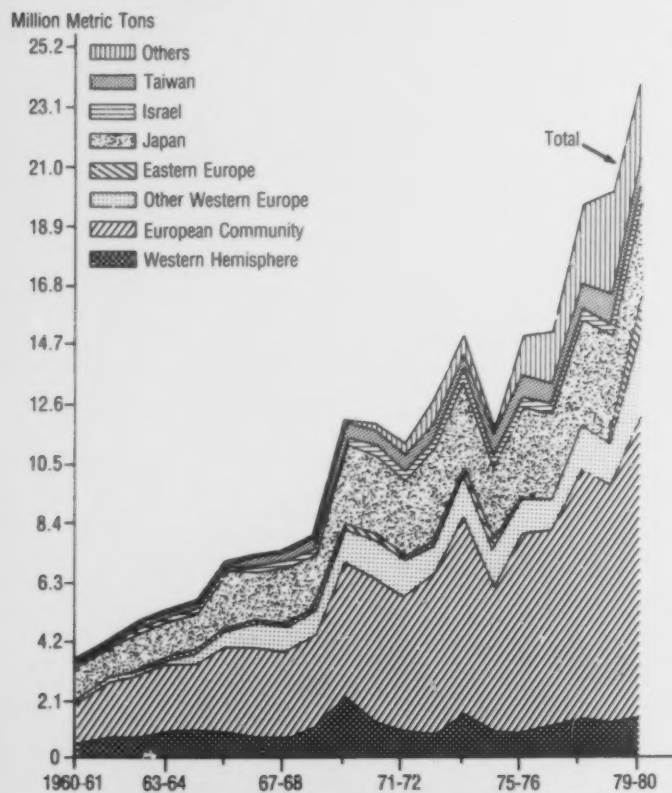


Figure 12. U.S. Soybean Exports by Destination, October-September, 1960-61 to 1979-80.

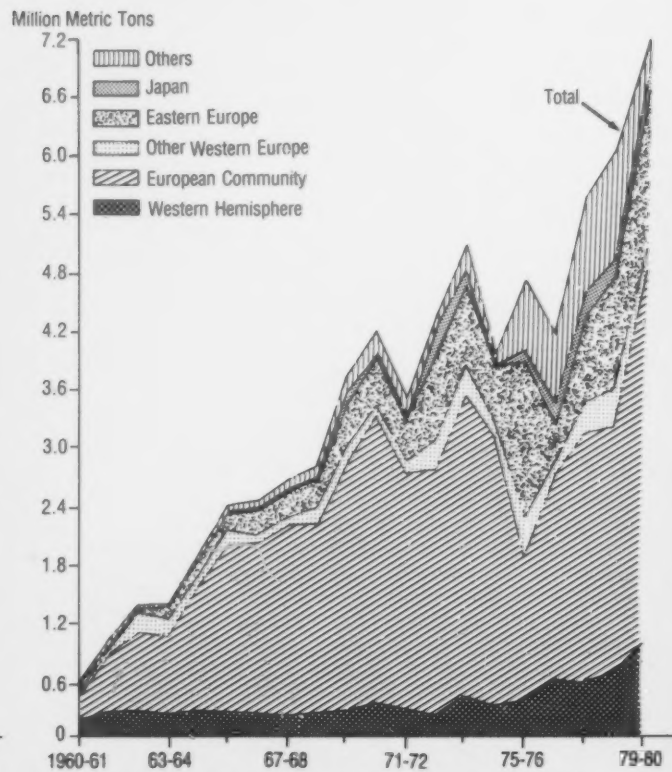


Figure 13. U.S. Soybean Meal Exports by Destination, October-September, 1960-61 to 1979-80.

where red meat, poultry and dairy products are a significant part of consumer diets. Figures 12 and 13 indicate the two largest export markets for U.S. soybeans and soy protein are Japan and the European Community, although a number of other nations are growing in importance as outlets for the U.S. soybean crop. The explosion in export demand for U.S. soybeans began 2 years earlier than in corn and all feed grains. From 1969-70 to 1979-80, U.S. soybean exports rose by 11.8 million metric tons, or 98 percent. Soybean meal exports in this same period rose by 3.5 million metric tons, or 96 percent.

Unlike corn, the Soviet Union so far has been a much less important market outlet for U.S. soybeans and soybean meal. Because of limited processing capacity, Eastern Europe imports only limited quantities of soybeans but has become a sizeable market for soybean meal. The opposite situation exists in Japan; ample processing capacity and strong consumer demand for soybean oil make that country a major outlet for U.S. soybeans but only a minor market for processed soybean products.

Yearly fluctuations in U.S. soybean and soybean meal exports in the 1970's originated largely in the European Community (EC), as shown in Figures 12 and 13. Variations in exports to the EC reflect yearly fluctuations in availability of protein feeds from competing exporters and domestic sources, changes in livestock and poultry feeding profitability and fluctuations in domestic protein meal inventories. In addition, the EC has an elaborate variable levy system for stabilizing domestic feed grain prices and insulating them from variations in world supplies. Soybeans and soybean products are excluded from this system, with EC protein meal prices being allowed to reflect world price variations.¹⁶ As a result, in years of high world protein meal prices, the EC feed industry tends to utilize more grain and less protein in livestock rations than at other times.

The "other" destination category expanded substantially in the mid and late 1970's. Major buyers of U.S. soybeans and soybean meal in this group are the Republic of Korea, China and Russia. By 1978-79, these countries as a group imported nearly as many U.S. soybeans as Japan. Their 1978-79 purchases of U.S. soybean meal were nearly equal to East European purchases.

While year-to-year variability of U.S. soybean and soybean meal exports has been substantially greater than in corn, the trend in exports was sharply upward in the 1970's. As with corn, continuation of the

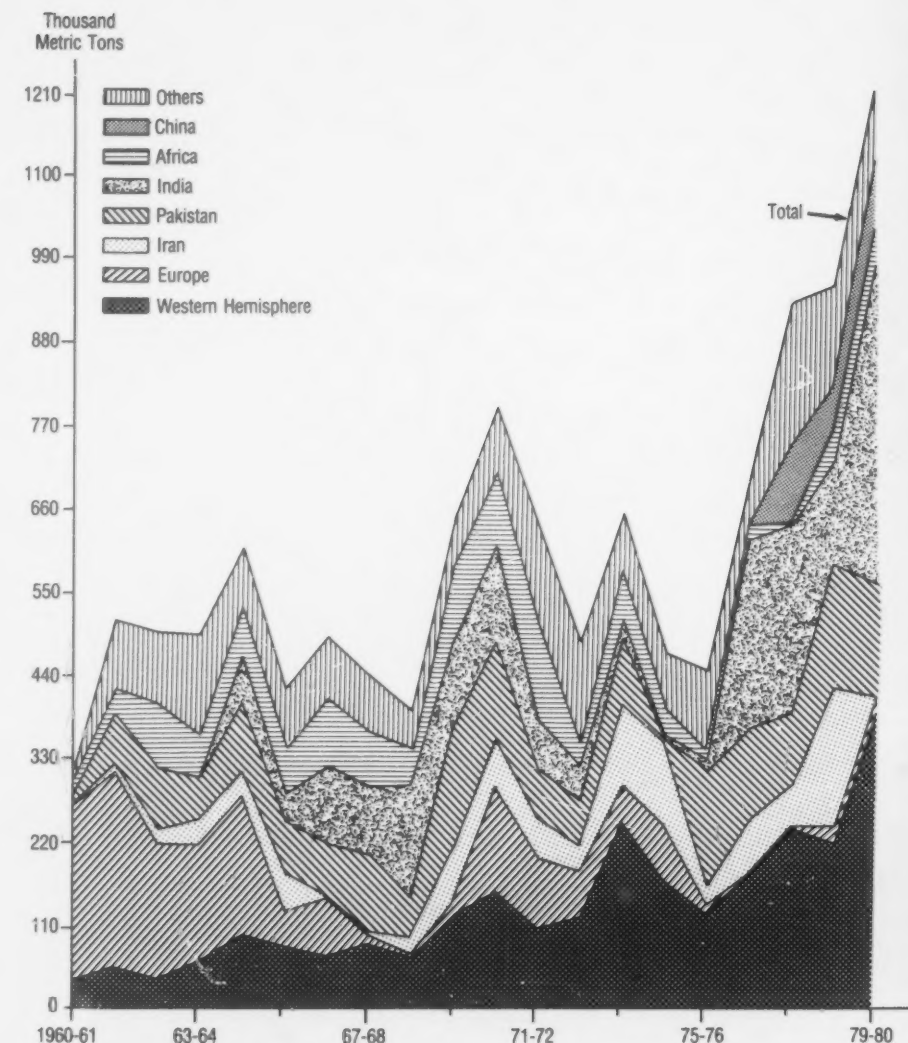


Figure 14. U.S. Soybean Oil Exports by Destination, October-September, 1960-61 to 1979-80.

growth rate of the past 10 years would present a major challenge to U.S. agriculture. Sharply increased soybean production would be required in the 1980's to meet growing world demand.

U.S. exports of soybean oil have been much more variable from year to year than soybeans, soybean meal or corn, as shown in Figure 14. Exports of this product go primarily to developing countries. Soybean oil exports showed no definite trend in the 1960's, but rose sharply from 1969-70 through 1970-71. In the next 5 years, U.S. soybean oil exports trended downward as a result of increased competition from palm oil, coconut oil, rapeseed oil and South American soybeans. In the late 1970's,

exports again rose sharply through the combined effects of growing world demand and disappointing oilseed crops in Russia, India and Brazil.

As Figure 14 indicates, Europe was a major outlet for U.S. soybean oil in the early 1960's, but has become much less important in recent years as that area's soybean processing capacity and soybean oil production expanded. Important foreign markets for U.S. soybean oil now include India, Pakistan and several Latin American countries.

Nearly all major foreign markets for U.S. soybean oil have been highly variable from year to year. Soybean oil competes with at

least a dozen other fats and oils in world markets, with U.S. exports tending to fluctuate inversely with availability of competing products. For example, during the 1970's, India's purchases of U.S. soybean oil ranged from near zero to as much as 430 thousand metric tons, depending partly on the availability of its domestic oilseed crops. Similar although somewhat less extreme variations occurred in U.S. soybean oil exports to Pakistan, Iran, Europe and Africa. African nations were a sizeable market for U.S. soybean oil in the 1960's but have dropped to almost insignificant levels in recent years.

While the long-term trend in U.S. soybean oil exports clearly is upward, the trend of the past two decades has not been as steeply upward as in the case of corn, soybeans and soybean meal. In the years immediately ahead, U.S. soybean oil exports are likely to remain vulnerable to large year-to-year fluctuations as supplies of competing fats and oils vary.

Long-Term Wheat Export Trends

Figure 15 shows little or no trend in total U.S. wheat exports during the 1960's, along with large year-to-year fluctuations as a result of changing foreign crop conditions. U.S. wheat exports rose sharply in 1972-73 but trended only slightly upward from this new higher level in the next 6 years. Much of the large increase in U.S. wheat exports in 1972-73 was due to the sudden emergence of the Soviet Union as a major importer of U.S. wheat for the first time since 1963-64. Russian purchases declined sharply in the next 2 years, but were partially offset by increased imports by India and China to offset short domestic crops. In the late 1970's, Soviet purchases of U.S. wheat were stabilized near the 3 to 4 million metric ton level specified in the 5-year U.S.-USSR grain agreement. That agreement was signed in late 1976 and expires in October 1981.

Since the mid-1970's, much of the variation in U.S. wheat exports can be attributed to fluctuating purchases by India, Pakistan, Western Hemisphere countries and China (included in the "others" category). U.S. wheat exports currently are shipped to a wide range of countries, including both developed and developing economies. Important outlets in developed economies include the European Community, other Western European countries and Japan. Wheat exports to these areas have been relatively stable in the last several years. The Middle East oil exporting countries also have emerged as a significant and relatively stable market for U.S. wheat in the past decade.

The long-term trend in wheat exports clearly is upward, although the growth rate

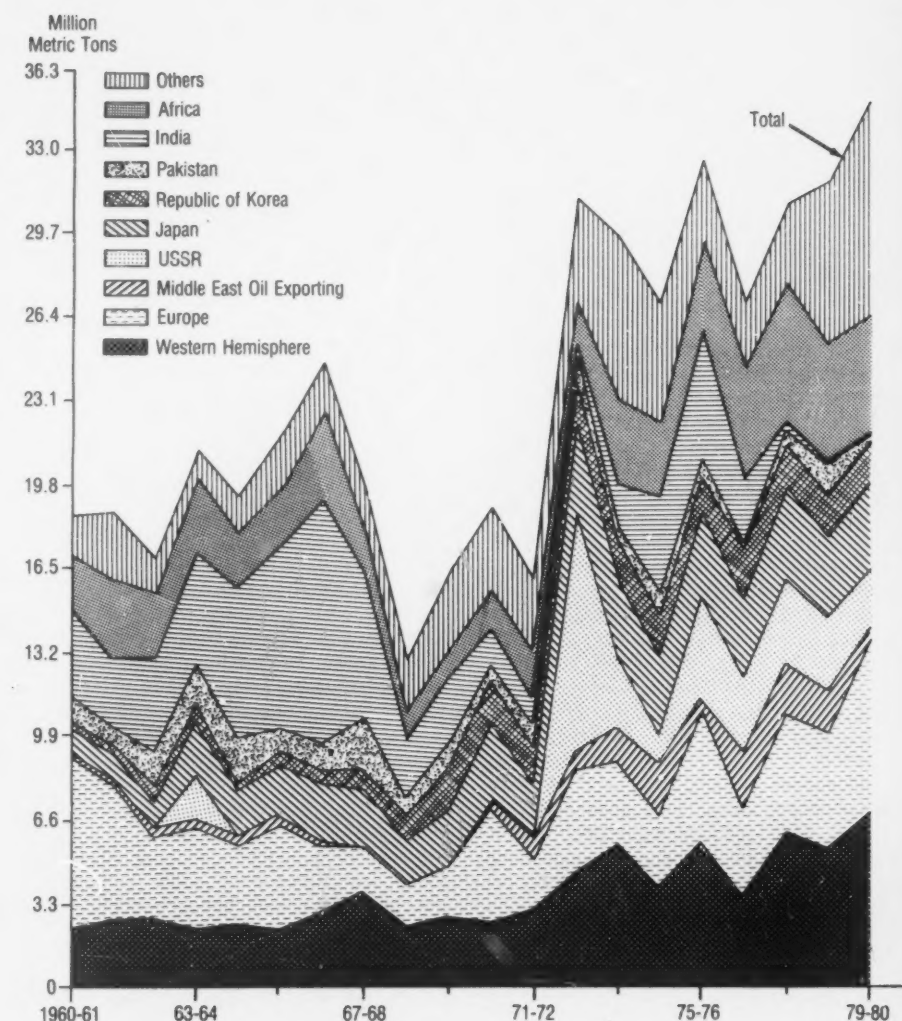


Figure 15. U.S. Wheat Exports by Destination, October-September Fiscal Years, 1960-61 to 1979-80.

since 1972 has been much slower than in feed grains, corn and soybeans. Unless export growth accelerates substantially, U.S. agriculture will face a smaller challenge in meeting world demand for wheat in the 1980's than in corn or soybeans.

U.S. Exports and the Partial Embargo on Grain Sales to USSR
From January 4, 1980, through April 24, 1981, U.S. sales of wheat and feed grains to the Soviet Union were restricted to the maximum 8 million metric tons specified in the 5-year U.S.-USSR grain agreement. In previous years, sales had been permitted to exceed this amount substantially. The embargo also completely halted U.S. soybean and soybean product exports to the

Soviet Union. As a result of the embargo, Soviet and world grain and oilseed trading patterns shifted significantly. Estimated Soviet imports of wheat, feed grains, soybeans and soybean meal in 1980-81 and the previous 5 years, along with U.S. and non-U.S. imports are shown in Table 13.

Total Soviet imports of grains, oilseeds and oilseed meals set a new record in 1979-80, approximately double the previous year's level and 17 percent above the old record in 1975-76. However, the U.S. share of Soviet grain imports dropped from 74 percent in 1978-79 to 50 percent in 1979-80, and a further sharp decline is occurring in 1980-81. Soviet imports of non-U.S. grain in 1979-80 were 11.3 million tons above the previous year, and

Table 13. Soviet Grain, Soybean and Soybean Meal Importing Patterns, 1975-76 through 1980-81.^a

	1975-76	1976-77	1977-78	1978-79	1979-80	Est. 1980-81
	(Mil. Metric Tons)					
Wheat Imports:^b						
U.S. Origin	4.0	2.9	3.3	2.9	3.9	4.0
Non-U.S. Origin	6.1	1.7	3.4	2.2	8.2	^d
Total	10.1	4.6	6.7	5.1	12.1	^d
Feed Grain Imports:^b						
U.S. Origin	9.9	4.5	9.2	8.3	11.3	4.0
Non-U.S. Origin	5.7	1.2	2.5	1.7	7.0	^d
Total	15.6	5.7	11.7	10.0	18.3	^d
Total Imports, all grains ^b	25.7	10.3	18.4	15.1	30.4	33.5
Percentage from U.S. Origin	54%	72%	68%	74%	50%	24%
Soybean Imports:^c						
U.S. Origin	0.31	0.91	0.85	1.18	0.81	.0
Non-U.S. Origin	1.37	0.55	0.36	0.59	0.26	1.50
Total	1.68	1.46	0.91	1.77	1.07	1.50
Percentage from U.S. Origin	18%	62%	93%	67%	76%	0.0
Soybean Meal Imports:^c						
U.S. Origin	0.0	0.08	0.57	0.05	0.0	0.0
Non-U.S. Origin	0.0	0.0	0.0	0.0	0.50	1.00
Total	0	0.08	0.57	0.05	0.50	1.00

^aSources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-20-81 (Washington, D.C.), May 13, 1981; *Foreign Agriculture Circular, Oilseeds and Products*, FOP-4-81, (Washington, D.C.), March 1981, and FOP-10-81, (Washington, D.C.), May 1981; U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), October 6, 1978, October 19, 1979 and October 3, 1980; U.S. Department of Agriculture, Agricultural Marketing Service, *Feed Market News* (Independence, Missouri), December 28, 1978, and December 3, 1980.

^bJuly-June trade years.

^cOctober-September marketing years.

^dSeparate estimates of non-U.S. wheat and feed grain imports are not available at this writing. However, combined Soviet imports of the two classes of grains from non-U.S. sources are projected at 27 million metric tons in 1980-81.

they are expected to be 23.1 million tons above 1978-79 in the trade year ending June 30, 1981. At the same time, 1980-81 Soviet imports of non-U.S. soybeans and soybean meal are projected to be approximately 2 million metric tons larger than 2 years earlier. To complete the picture, Soviet exports of grain to other centrally planned countries in 1980-81 are expected to be about 2 million metric tons smaller than in 1978-79.

These trade data indicate the partial U.S. embargo, along with similar trade restrictions by the European Community, Canada, Australia and New Zealand, did not prevent the Soviet Union from importing large quantities of grain. Had the embargo not been in effect, U.S. grain

exports to the Soviet Union likely would have been larger. At the same time, large supplies of non-U.S. grain would have been diverted from Russia into other foreign markets, and likely would have reduced U.S. exports to non-Soviet destinations. As Figures 10 through 12 and 15 indicate, shifting trade patterns brought sharply expanded U.S. exports to several non-Soviet markets in 1979-80, which more than offset reduced sales to Russia. This same trading pattern is continuing in 1980-81. In the years immediately ahead, if the Soviet Union returns to its former level of U.S. grain purchases, U.S. grain exports to other destinations could temporarily decline as world grain trading reverts back to the pattern of pre-embargo years.

Emerging Issues in U.S. and World Agricultural Trade

The most striking feature of global trade in agricultural products is the rapidly expanding world demand for feed grains, soybeans and soybean meal during the past decade. So far, all signs point to continued significant growth in world demand for these products in the years immediately ahead. Further growth in world and U.S. exports of food grains and soybean oil also appears likely in the 1980's, although the recent growth rate for these products has been less rapid than for feed ingredients for animal agriculture. The prospect for growth of export demand similar to the decade of the 1970's raises several key issues for world agriculture and the world community in general. These questions center around the need for investment in agricultural research and education, world food security, financing of food imports by developing nations, implications of producing energy from agricultural products, and trade policies in an era of uncertain supplies.

How Will Future Demand Growth Be Met?

Growing world imports of feed grains in the 1970's were supplied largely from expanded U.S. production, with the United States accounting for 69 percent of the total world feed grain exports at the end of the decade. U.S. production rose to meet the expanded demand as 25 million hectares (63 million acres)¹⁷ of idle land were returned to production and as U.S. producers expanded their use of fertilizer, chemicals, high capacity machinery and other available technology. Outside the U.S., production was increased moderately through expanded use of available technology and land clearing in areas such as South America.

In the years ahead, additions to the world's cropland base will be more expensive and will occur more slowly than in the 1970's. In the U.S., much of the additional land available for crop production has substantial erosion hazards, drainage problems or other natural characteristics that limit its production potential. Outside the United States, additional land is available for conversion to grain production, particularly in South America. However, the experience of the 1970's suggests expanded non-U.S. production alone is unlikely to match the growth in world demand.

These trends reveal an urgent need for expanded agricultural research and education in the U.S. and abroad to generate the production that will meet anticipated future demand growth. High priority areas for research include yield-increasing and cost-reducing technology for crop production, systems of livestock and poultry production that use grain more efficiently, procedures for reducing soil erosion risks and converting unused land to crop production, development of crop varieties with greater resistance to drought and other climatic limitations, and development of procedures for reducing losses during harvesting, handling, storage and transporting.

World Food Security

With world grain stocks declining toward the low point of the mid-1970's despite the second largest world grain crop on record in 1980-81, the need for expanded world grain reserves is apparent. Both importing and exporting nations have an important stake in maintaining reserves to offset fluctuating production. If world demand for agricultural products continues to expand at the same rate as in the 1970's, fluctuations in world grain production will likely cause increasingly severe shocks to the U.S. and world livestock industries and will create pressure for artificial trade restraints during years of short crops. Key issues in world grain reserves still to be resolved include (1) size of reserves needed, (2) where reserves should be stored, (3) how costs of storing reserve stocks should be shared and (4) prices or other conditions under which stocks will be accumulated and released.¹⁸

Financing Food Imports of Developing Nations

In their ability to pay for needed food imports, developing nations can be classified into (1) exporters of petroleum and/or other raw materials that are in strong demand, and (2) "others." The first group includes such countries as Mexico, Venezuela, Nigeria, and several Middle East and North African nations. These countries are in a strong position to finance food imports and expanded domestic agricultural production. The "other" category, however, faces much more serious pressures from the large real increase in energy costs in the 1970's, rising grain prices and inflation in costs of other imports.¹⁹ As noted in an earlier section,

per capita food production in this economic group declined slightly during the past two decades, at the same time that production was rising in the other three major economic categories. Thus, the "other developing nations" have been hit by a slightly deteriorating internal food situation along with sharply increased costs of energy and other imports. Since many of these nations already have incurred large long-term debts, financing of additional food imports and improvements in internal food production will be a major challenge in the 1980's.

Energy from Agricultural Products

Several nations including the United States, Brazil, Austria, South Africa and Australia have national policies encouraging conversion of agricultural crops to motor fuel for automotive and farm machinery use. The agricultural products involved include grain and sugar as sources of ethyl alcohol, and vegetable oils such as soybean oil and sunflower oil for use in diesel engines. Interest in agriculturally produced fuels has been generated by the high cost of petroleum, political instability in some major producing countries and uncertain long-term petroleum supply prospects. In some cases, sizeable government subsidies or tax incentives are being utilized to encourage the production of motor fuel from farm products.

Agriculturally based fuels presently represent only a minor share of the total world demand for farm products, but the potential demand would be sizeable if current government incentives are maintained or expanded. Unless accompanied by aggressive efforts to increase crop production, expanded alcohol-vegetable oil fuels programs would have serious implications for world livestock and poultry producers and consumers, world food security and the cost and availability of grain for food uses.²⁰

Trade Policies in an Era of Uncertain Supplies

For more than two decades, efforts have been underway to reduce restrictions on trade in agricultural products. U.S. grain producers and foreign consumers have much to gain from allowing market forces to allocate global supplies of agricultural products freely. However, in the present period of uncertain supplies, other

objectives appear to be moderating the movement toward less restrictive trade. Several nations maintain domestic prices well above world levels in an effort to increase domestic production and discourage consumption. Included in this group are Japan and most Western European nations. Other nations such as the Soviet Union and many centrally planned countries subsidize domestic consumers, setting food prices below world levels and insulating them from fluctuations in world supply and demand conditions. Such policies encourage consumption and discourage production.

In addition, the United States has entered into specific grain supply agreements with three nations—Russia, China and Mexico—along with less formal agreements with several other countries. These agreements provide for specific quantities of products to be exported by the United States to the importing nation, regardless of the world and U.S. supply situation or demand in other importing countries. These and other trade restrictions tend to bypass market

forces that would otherwise restrict foreign usage in periods of tight world supplies and would encourage increased usage in times when supplies are large. Such restrictions also tend to transfer an increasing portion of the year-to-year adjustment from fluctuating world grain supplies to livestock industries in the U.S. and in the limited number of other nations that have few or no restrictions on grain trade.

Similar medium-term trade agreements are emerging from other grain exporting nations such as Argentina, Canada, Australia and France. If growth of world demand for grain follows the trend of the 1970's, more grain importing countries likely will request such agreements in an effort to insure supplies. The trend toward allocation of supplies by political agreements could eventually cancel out gains from trade liberalization of previous years. In times of critically tight world supplies, such agreements also might restrict the availability of grain imports into developing nations.

One other area of trade policy likely to receive attention in the 1980's is the role of agricultural trade as a diplomatic tool. In at least two instances in the last 2 years, trade restrictions have been implemented for such purposes. From experiences with the partial embargo on sales to the Soviet Union, it can be concluded that such policies are difficult to enforce, can be offset by actions of other food exporting countries and have not been fully effective. In more subtle cases, attractive financing or special subsidies for food purchases may be extended to gain favors from foreign nations. Such actions can bring short-term political gains, but reduce the incentive for the recipient country to deal with its long-term food problems. Despite the undesirable aspects of using agricultural trade as a diplomatic tool, the likelihood of its use will increase in an era of uncertain world grain supplies. Thus, agricultural trade policy may well become a critical issue facing the world community in the 1980's.

Notes

1. Estimated world grain carryover stocks do not include complete inventories in certain centrally planned countries such as Russia and China, since stocks data for these areas are not available.

2. U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* FG-28-81 (Washington, D.C.), July 14, 1981.

3. Food and Agriculture Organization of the United Nations, *Production Yearbook*, Vol. 14, p. 15 and Vol. 33, p. 61 (Rome, Italy), 1960 and 1980. Population data for China were obtained from U.S. Department of Commerce, Bureau of Census, *International Population Dynamics, 1950-79, Demographic Estimates For Countries With a Population of 5 Million or More* (Washington, D.C.), 1980, p. 89.

4. Countries included in each economic grouping are shown in Appendix I.

5. For a detailed analysis of trends in trade shares of major agricultural exporters and importers since 1960, see Alan J. Webb, *World Trade in Major U.S. Crops, A Market Share Analysis*, U.S. Department of Agriculture, Economics and Statistics Service, ESS-7 (Washington, D.C.), April 1981.

6. Trends in non-U.S. exports of wheat, feed grains, soybeans and soybean products during the 1960's and 1970's are shown in Appendix II.

7. Based on data in U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG-28-81 (Washington, D.C.), July 14, 1981.

8. Ibid.

9. Data on U.S. and world exports of soybeans and soybean products were obtained from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 16-78 (Washington, D.C.), November 1978, and FOP 10-81 (Washington, D.C.), May 1981.

10. U.S. Department of Agriculture, Economics and Statistics Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November/December 1980, p. 4.

11. U.S. Department of Agriculture, 1980 *Handbook of Agricultural Charts*, Agriculture Handbook No. 574 (Washington, D.C.), October 1980, p. 64.

12. For an analysis of the changing position of U.S. non-agricultural exports in world markets, see the Central Intelligence Agency, National Foreign Assessment Center, *The U.S. Position in World Markets*, ER79-10466 (Washington, D.C.), August 1979.

13. Susan A. Libbin, "Review of Public Law 480 and Other U.S. Food Aid Programs, Fiscal Years 1955-79" in U.S. Department of Agriculture, Economics and Statistics Service, *Foreign Agricultural Trade of the U.S.* (Washington, D.C.), November/December 1980, pp. 79-102.

14. For further explanation of the principle of comparative advantage, see James P. Houck and Peter K. Pollak, "Basic Concepts of Trade," in *Speaking of Trade, Its Effect on Agriculture*, Agricultural Extension Service, University of Minnesota (St. Paul, Minn.), Special Report No. 72, November 1978, pp. 21-35.

15. Data on U.S. exports of grains, oilseeds and oilseed products by destinations were obtained from U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* and *Feed Market News* (Independence, Mo.) various issues, and Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.) various issues. Maps illustrating the geographic flows of U.S. grain, oilseed and oilseed product exports to final destinations in 1979-80 are included in Appendix III.

16. Cathy L. Jabara, *Trade Restrictions In International Grain and Oilseed Markets, A Comparative Country Analysis*, U.S. Department of Agriculture, Economics and Statistics Service, Foreign Agricultural Report No. 162 (Washington, D.C.), January 1981, pp. 9 and 17.

17. U.S. Department of Agriculture, *Agricultural Statistics 1976*, U.S. Government Printing Office (Washington, D.C.), 1976, p. 518.

18. These and other issues relating to grain reserves are discussed in David J. Eaton and W. Scott Steele, *Analysis of Grain Reserves, a Proceedings*, U.S. Department of Agriculture, Economic Research Service (Washington, D.C.), ERS-634, August 1976, and D. Gale Johnson, *World Food Problems and Prospects*, American Enterprise Institute for Public Policy Research (Washington, D.C.), June 1975.

19. The financial situation of individual developing nations and pressures from rising input costs are discussed in U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service, *Global Food Assessment, 1980* (Washington, D.C.), Foreign Agricultural Economic Report No. 159, July 1980, and U.S. Department of Agriculture, Economics, Statistics

and Cooperatives Service, *Report Assessing Global Food Production and Needs As of April 15, 1979*, ESCS-61 (Washington, D.C.), October 1979, pp. 51-69.

20. For discussions of the economics of alcohol fuels see W. E. Tyner and J. C. Bottum, *Agricultural Energy Production: Economic and Policy Issues*, Agricultural Experiment Station, Purdue University (W. Lafayette, Indiana) Station Bulletin No. 240, September 1979; J. G. Kendrick and P. J. Murray, *Grain Alcohol In Motor Fuels*, Agricultural Experiment Station, University of Nebraska (Lincoln, Nebraska), Report No. 81, April 1978; J. C. Purcell, *Gasohol and Ag-Food Prices*, Interregional Cooperative

Publication of the State Agricultural Experiment Stations (Athens, Georgia), IR-6 Information Report No. 4, January 1981; L. W. Schruben and L. Landkamer, *Profitability of Small-Scale Fuel Alcohol Production*, Agricultural Experiment Station, Kansas State University (Manhattan, Kansas), Research Bulletin 172, March 1981; R. N. Wisner and G. O. Gidel, *Economic Aspects of Using Grain Alcohol As a Motor Fuel, With Emphasis on By-Product Feed Markets*, Department of Economics, Iowa State University (Ames, Iowa), Economic Report Series No. 9, June 1977; and Schnittker Associates, *Ethanol: Farm and Fuel Issues* (Washington, D.C.), prepared for U.S. National Alcohol Fuels Commission, August 1980.

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James P. Houck and Peter K. Pollak, "Basic Concepts of Trade," in *Speaking of Trade, Its Effect on Agriculture*, Agricultural Extension Service, University of Minnesota (St. Paul, Minn.), Special Report No. 72, November 1978.

Cathy L. Jabara, *Trade Restrictions in International Grain and Oilseed Markets, A Comparative Country Analysis*, U.S. Department of Agriculture, Economics and Statistics Service, Foreign Agricultural Report No. 162 (Washington, D.C.), January 1981.

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J. G. Kendrick and P. J. Murray, *Grain Alcohol in Motor Fuels*, Agricultural Experiment Station, University of Nebraska (Lincoln, Nebraska), Report No. 81, April 1978.

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J. C. Purcell, *Gasohol and Ag-Food Prices*, Interregional Cooperative Publication of the State Agricultural Experiment Stations (Athens, Georgia), IR-6 Information Report No. 4, January 1981.

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U.S. Department of Agriculture, Economics and Statistics Service, *U.S. Foreign Agricultural Trade Statistical Report, Calendar Year 1979* (Washington, D.C.), October 1980.

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U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 16-78 (Washington, D.C.), November 1978, FOP 10-81 (Washington, D.C.), May 1981 and FOP 11-81 (Washington, D.C.), June 1981.

U.S. Department of Commerce, Bureau of the Census, *International Population Dynamics, 1950-79, Demographic Estimates for Countries With a Population of 5 Million or More* (Washington, D.C.), 1980.

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R. N. Wisner and G. O. Gidel, *Economic Aspects of Using Grain Alcohol as a Motor Fuel, with Emphasis on By-Product Feed Markets*, Department of Economics, Iowa State University (Ames, Iowa), Economic Report Series No. 9, June 1977.

Appendix I

Classification of Countries by Economic Category

Developed Market Economies

1. Australia
2. Austria
3. Canada
4. Denmark
5. Finland
6. West Germany
7. France
8. Iceland
9. Ireland
10. Italy
11. Japan
12. Luxembourg and Belgium
13. The Netherlands
14. Norway
15. Sweden
16. Switzerland
17. United Kingdom
18. United States

Centrally Planned Economies

1. Albania
2. Angola
3. Bhutan
4. Bulgaria
5. China
6. Cuba
7. Czechoslovakia
8. East Germany
9. Hungary
10. Khmer
11. Korea (North)
12. Laos
13. Mongolia
14. Mozambique
15. Poland
16. Romania
17. South Yemen
18. USSR
19. Vietnam
20. Yugoslavia

Rapidly and Moderately Developing Nations

1. Algeria
2. Argentina
3. Bolivia
4. Brazil
5. Cameroun
6. Chile
7. Colombia
8. Congo
9. Costa Rica

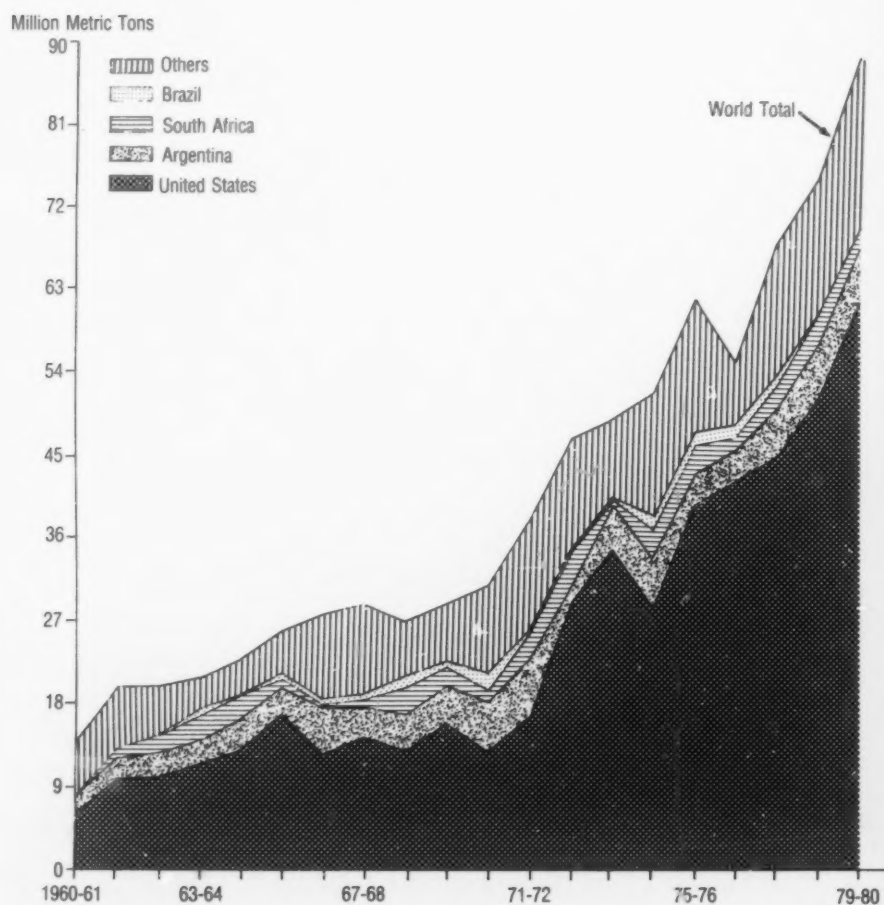
10. Cyprus
11. Dominican Republic
12. Ecuador
13. Egypt
14. El Salvador
15. Ghana
16. Greece
17. Guatemala
18. Honduras
19. India
20. Indonesia
21. Iran
22. Iraq
23. Israel
24. Ivory Coast
25. Jamaica
26. Jordan
27. Korea (South)
28. Kuwait
29. Lebanon
30. Liberia
31. Libya
32. Malaysia
33. Mexico
34. Morocco
35. New Zealand
36. Nicaragua
37. Nigeria
38. Pakistan
39. Panama
40. Papua New Guinea
41. Paraguay
42. Peru
43. Philippines
44. Portugal
45. Puerto Rico
46. Saudi Arabia
47. Senegal
48. Singapore
49. South Africa
50. Spain
51. Syria
52. Taiwan
53. Thailand
54. Trinidad
55. Tunisia
56. Turkey
57. Uruguay
58. Venezuela
59. North Yemen
60. Zambia
61. Zimbabwe

Other Developing Nations

1. Afghanistan
2. Bahamas
3. Bahrain
4. Bangladesh
5. Barbados
6. Botswana
7. Burma
8. Burundi
9. Central African Republic
10. Chad
11. Comoros
12. Cape Verde
13. Djibouti
14. Dominica
15. Dahomey
16. Ethiopia
17. Equatorial Guinea
18. Fiji
19. Gabon
20. The Gambia
21. Grenada
22. Guinea
23. Guinea Bissau
24. Guyana
25. Haiti
26. Kenya
27. Lesotho
28. Madagascar
29. Malawi
30. Maldives
31. Mali
32. Malta
33. Mauritania
34. Mauritius
35. Nepal
36. Niger
37. Oman
38. Qatar
39. Rwanda
40. St. Lucia
41. Sao Tome Principe
42. Seychelles
43. Sierra Leone
44. Solomon
45. Somalia
46. Sri Lanka
47. Sudan
48. Surinam
49. Swaziland
50. Tanzania
51. Togo
52. Uganda
53. United Arab Emirates
54. Upper Volta
55. Western Samoa
56. Zaire

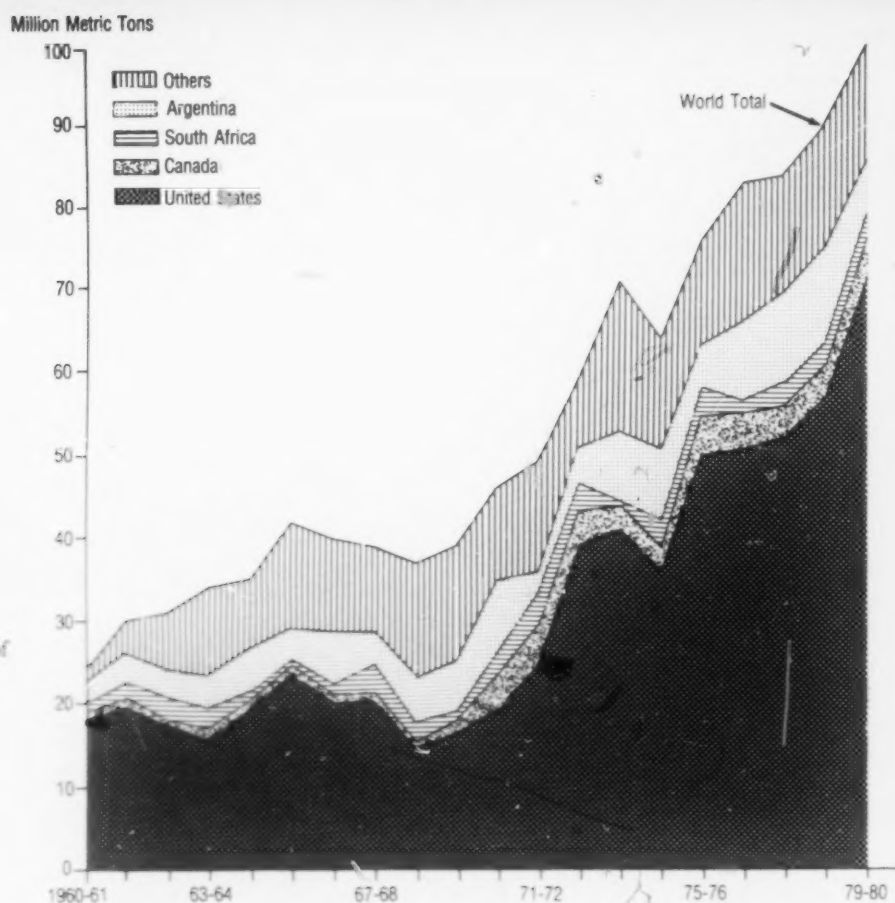
Appendix II

World Grain, Soybean and Soybean Product Exports by Country of Origin, 1960-1973

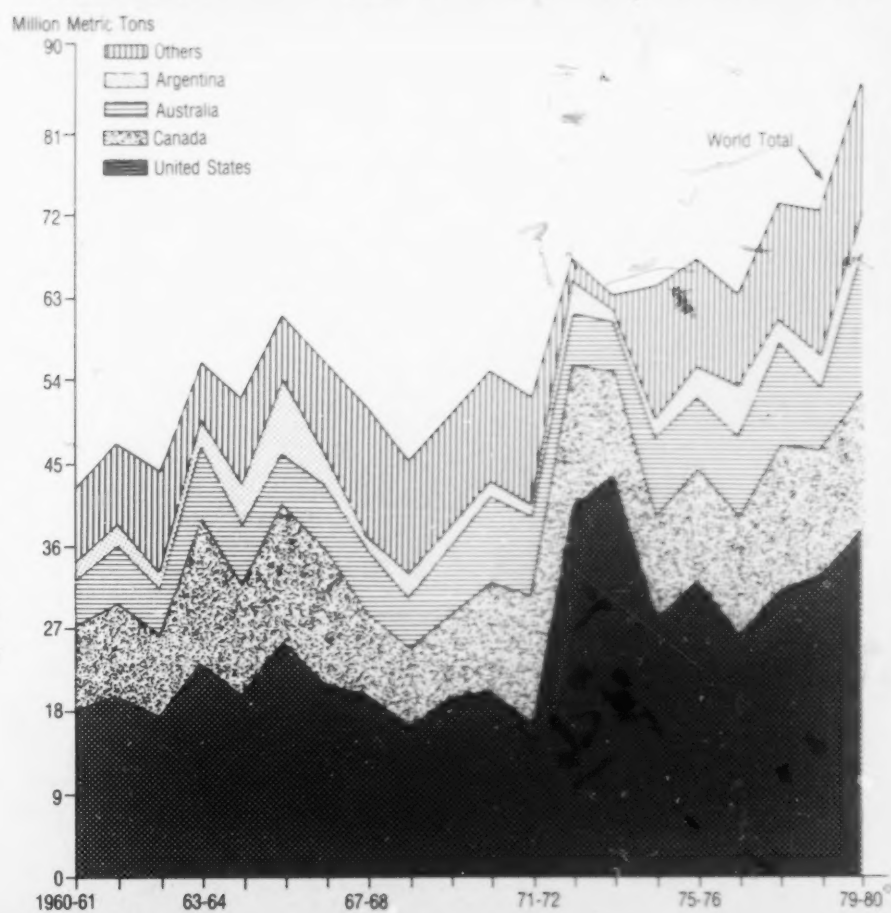


Appendix II, Figure 1. World Corn Exports by Country of Origin, October-September, 1960-61 to 1979-80.
Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).

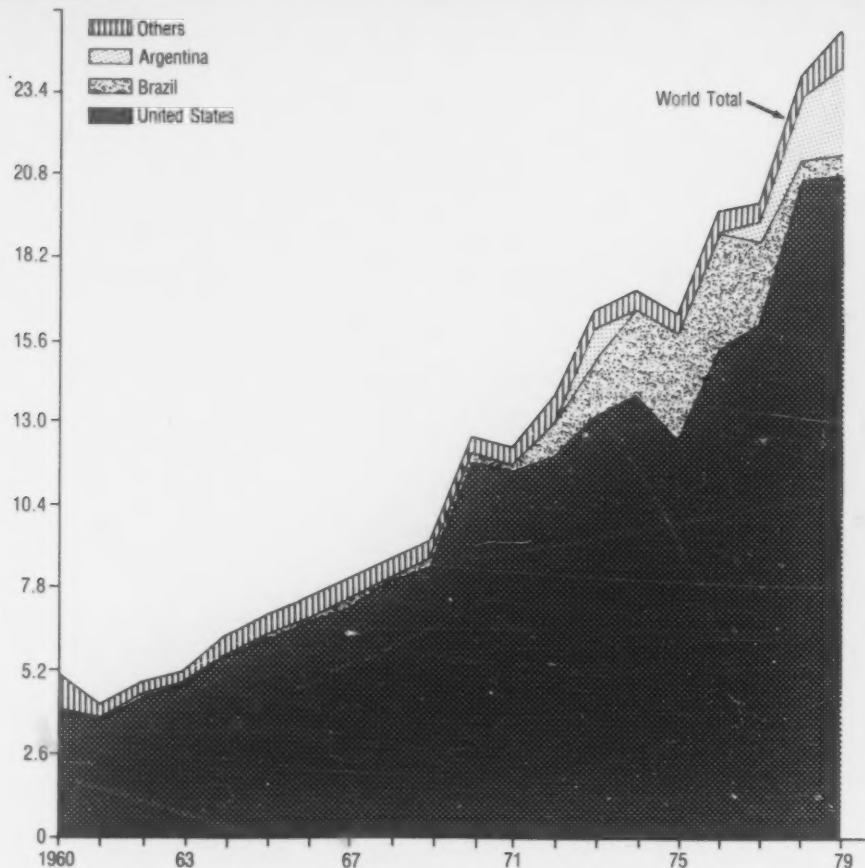
Appendix II, Figure 2. World Coarse Grain Exports by Country of Origin, October-September, 1960-61 to 1979-80.
Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).



Appendix II, Figure 3. World Wheat Exports by Country of Origin, July-June, 1960-61 to 1979-80.
Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).



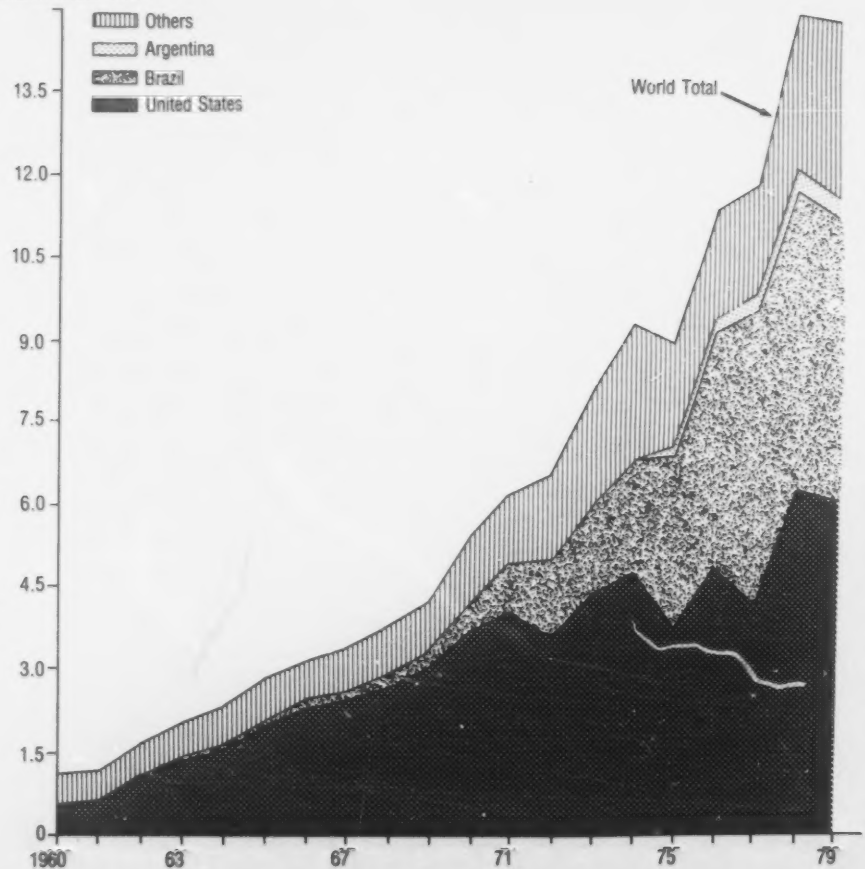
Million Metric Tons



Appendix II, Figure 4. World Soybean Exports by Country of Origin, Calendar Years 1960 to 1979.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).

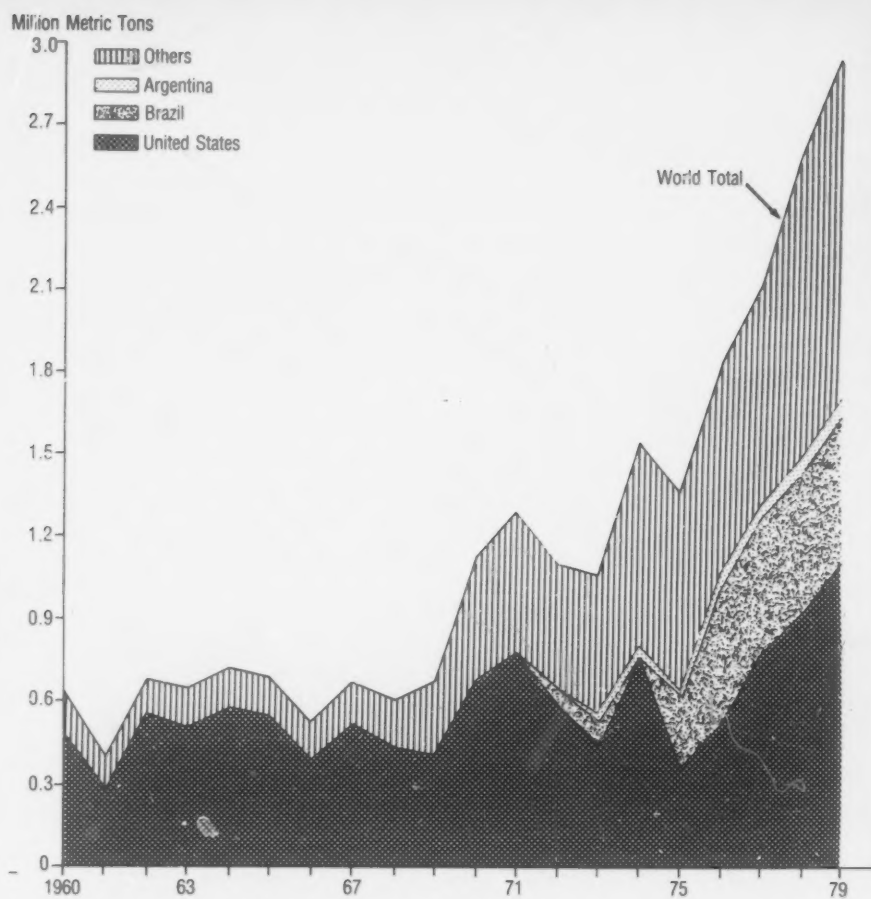
Million Metric Tons



Appendix II, Figure 5. World Soybean Meal Exports by Country of Origin, Calendar Years 1960 to 1979.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).

Appendix II, Figure 6. World Soybean Oil Exports by Country of Origin, Calendar Years 1960 to 1979.
 Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).



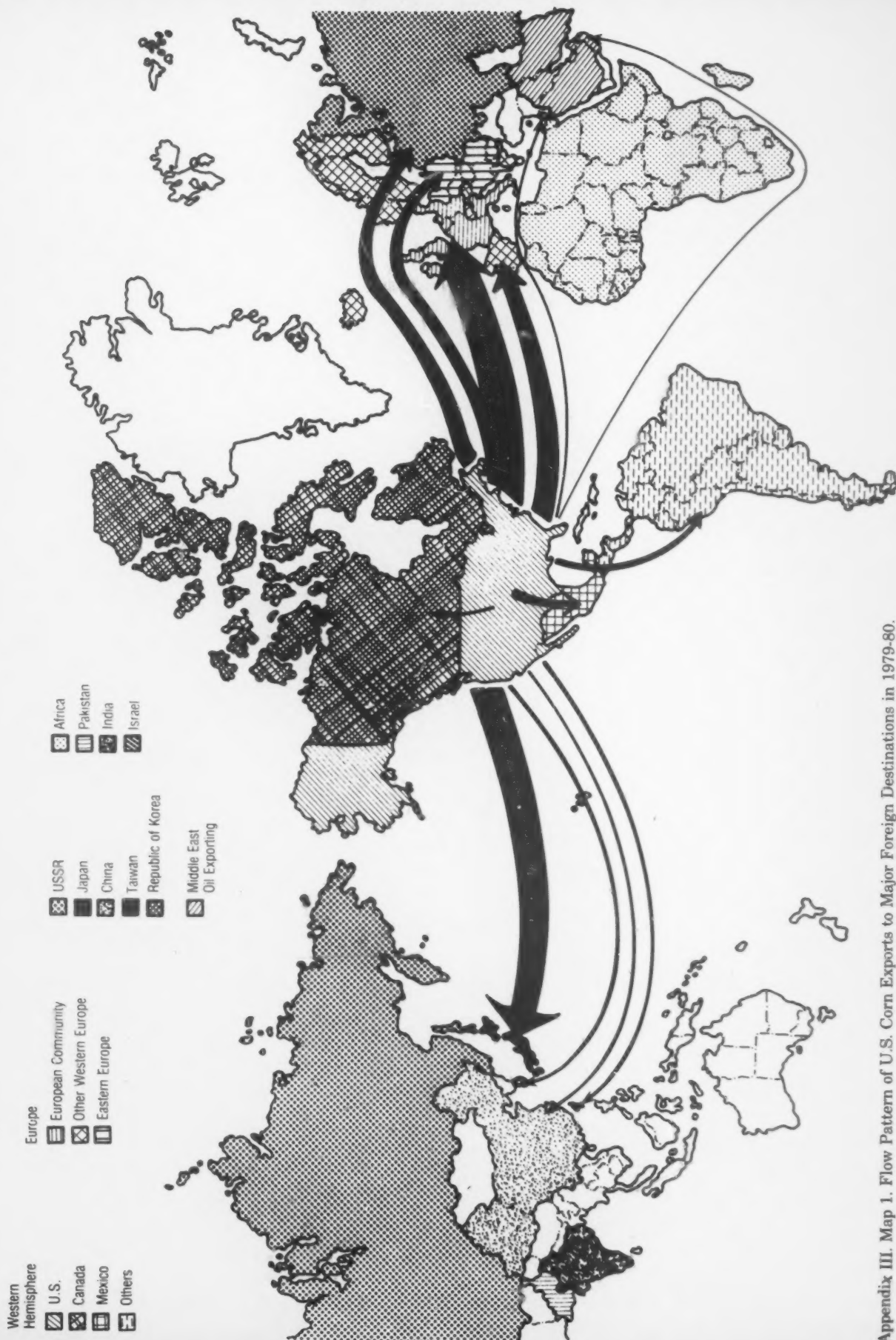
Appendix III:

Maps and Tables Showing Destinations and Ports of U.S. Grain, Soybean and Soybean Product Exports in 1979-80

Appendix III, Table 1. U.S. Corn Exports in Thousands of Metric Tons by Port Areas and Major Destinations, October-September 1979-80.

Destination	St. Lawr. Swy. & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Canada	831.96	0	0	0	7.47	839.43
Mexico	0	0	2491.78	337.63	775.88	3605.29
Other Western Hemisphere	0	46.21	3713.55	0	0	3759.76
European Community	1689.23	1974.71	8379.42	0	6.32	12049.68
Other Western Europe	1488.10	3742.43	2506.97	0	0	7737.50
Eastern Europe	755.86	2165.83	3132.32	0	0	6054.02
Middle East Oil Exporting Countries	2.10	80.52	140.57	0	0	244.09
Japan	13.59	24.13	6731.41	4541.27	0	11310.41
Republic of Korea	0	32.10	560.38	1544.92	0	2138.30
USSR	748.84	654.26	4199.63	263.13	0	5865.89
Others	79.32	1117.47	4694.82	1360.23	0	7252.75
TOTAL	4610.00	9838.56	36550.85	8047.18	789.67	60837.07

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence Mo.) various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.) various issues.

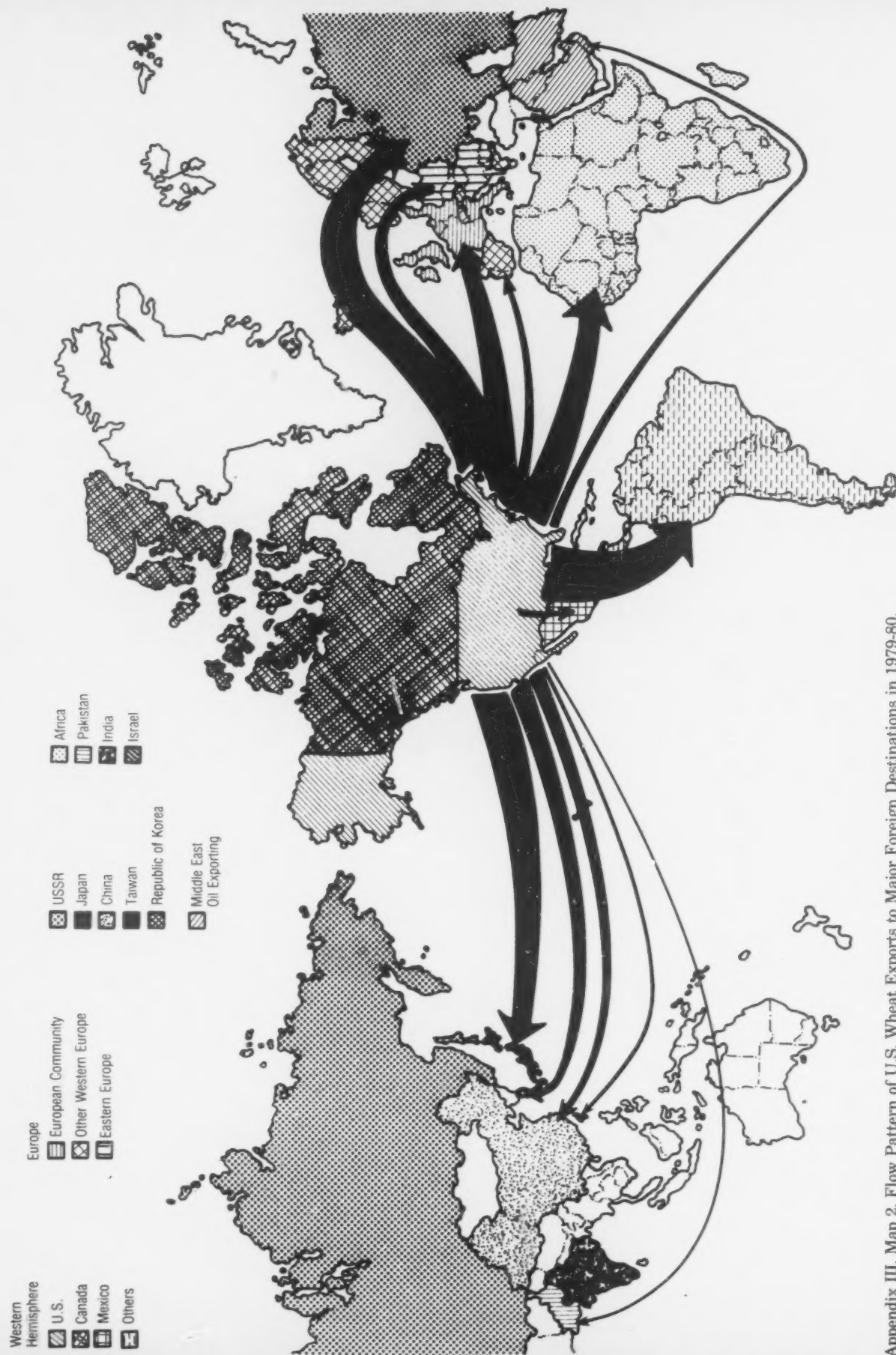


Appendix III. Map 1. Flow Pattern of U.S. Corn Exports to Major Foreign Destinations in 1979-80.

Appendix III, Table 2. U.S. Wheat Exports in Thousands of Metric Tons by Port Areas and Major Destinations, June-May 1979-80.

Destination	St. Lawr. Swy. & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Mexico	0	0	716.59	136.30	77.21	930.10
Other Western Hemisphere	214.84	0	5424.17	486.70	0	6125.71
European Community	1774.43	20.30	1146.56	0	0	2941.29
Other Western Europe	316.11	79.50	911.50	0	0	1307.11
Eastern Europe	118.58	201.12	2092.87	0	0	2412.57
Middle East Oil Exporting Countries	344.59	0	410.02	353.47	0	1108.08
Pakistan	0	34.51	46.43	143.167	0	224.61
India	0	0	.46	0	0	.46
USSR	0	0	3481.93	612.05	0	4093.98
Japan	0	0	89.13	3108.78	0	3197.91
China	158.48	289.44	514.35	682.24	0	1486.03
Taiwan	0	0	57.45	734.00	0	791.45
Republic of Korea	0	0	0	1813.67	0	1813.67
Africa	885.32	238.24	2012.67	24.00	0	3160.23
Others	54.78	153.95	2053.36	3089.89	0	5351.98
TOTAL	3867.13	1017.07	18957.50	11185.43	77.21	35104.34

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence Mo.) various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.) various issues.

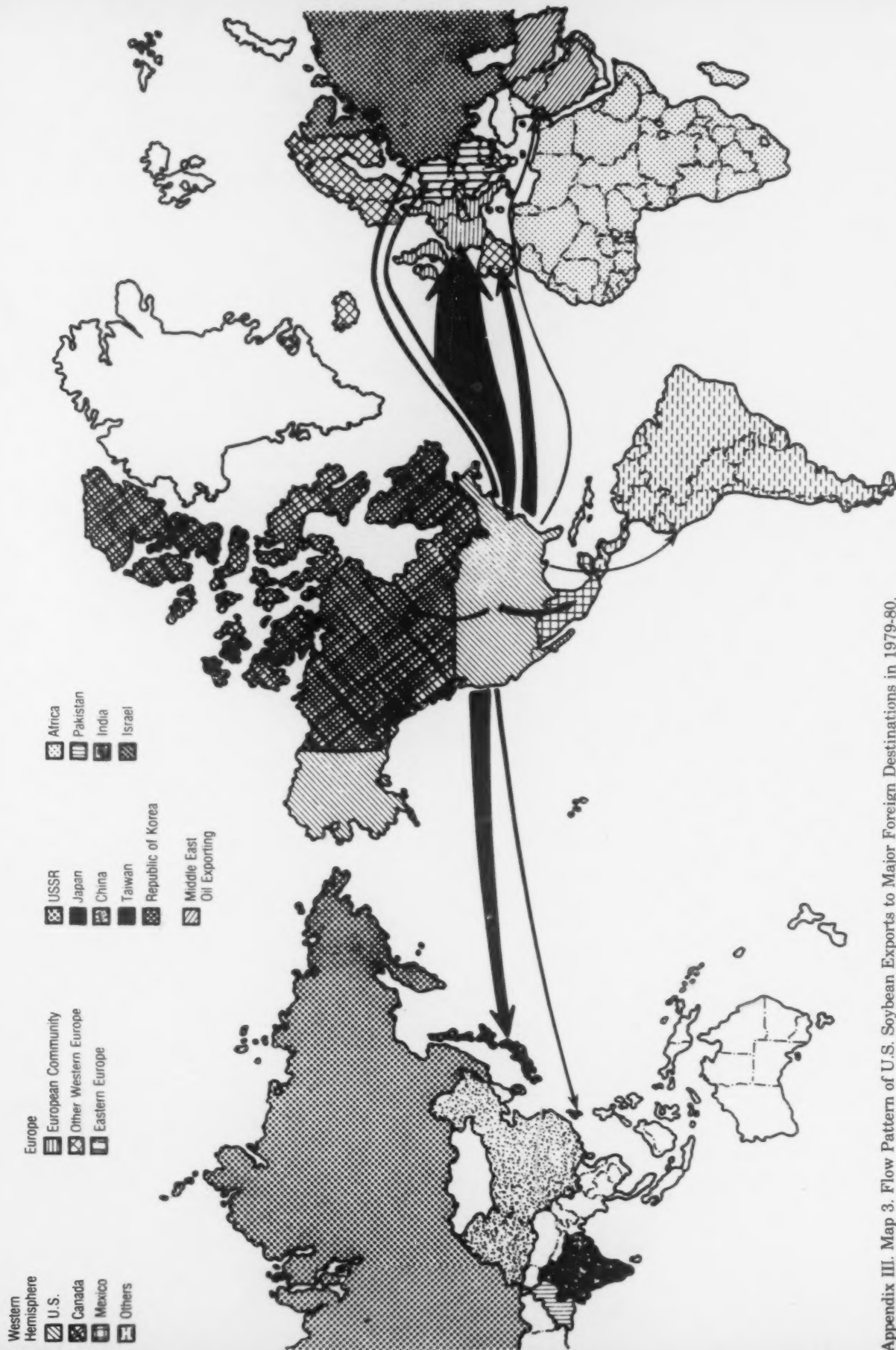


Appendix III. Map 2. Flow Pattern of U.S. Wheat Exports to Major Foreign Destinations in 1979-80.

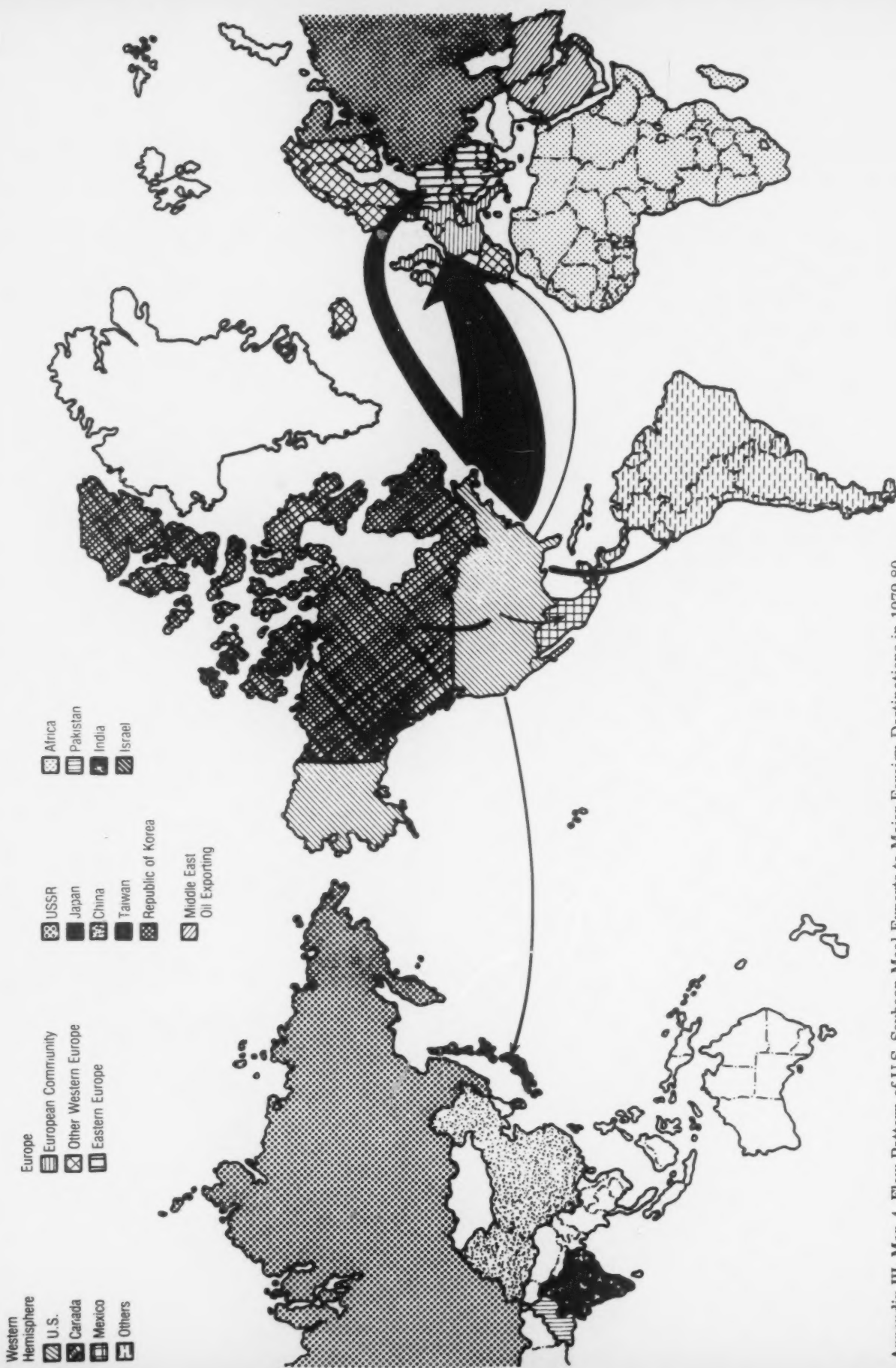
Appendix III, Table 3. U.S. Soybean Exports in Thousands of Metric Tons by Port Areas and Major Destinations, October-September 1979-80.

Destination	St. Lawr. Swy. & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Canada	373.21	0	0	0	2.56	375.77
Mexico	0	0	503.36	0	229.78	733.14
Other Western Hemisphere	0	43.93	209.15	0	0	253.08
European Community	478.86	807.84	9528.03	0	0	10814.73
Other Western Europe	410.77	1044.07	1689.08	0	0	3143.92
Eastern Europe	0	380.28	501.75	0	0	882.03
Taiwan	0	79.69	770.71	0	0	850.40
Israel	85.57	121.25	167.54	0	0	374.36
Japan	307.86	273.03	3539.14	9.44	0	4129.47
Others	31.27	299.83	2230.75	0	2.56	2564.41
TOTAL	1032.67	3049.91	19144.51	9.44	234.90	23746.95

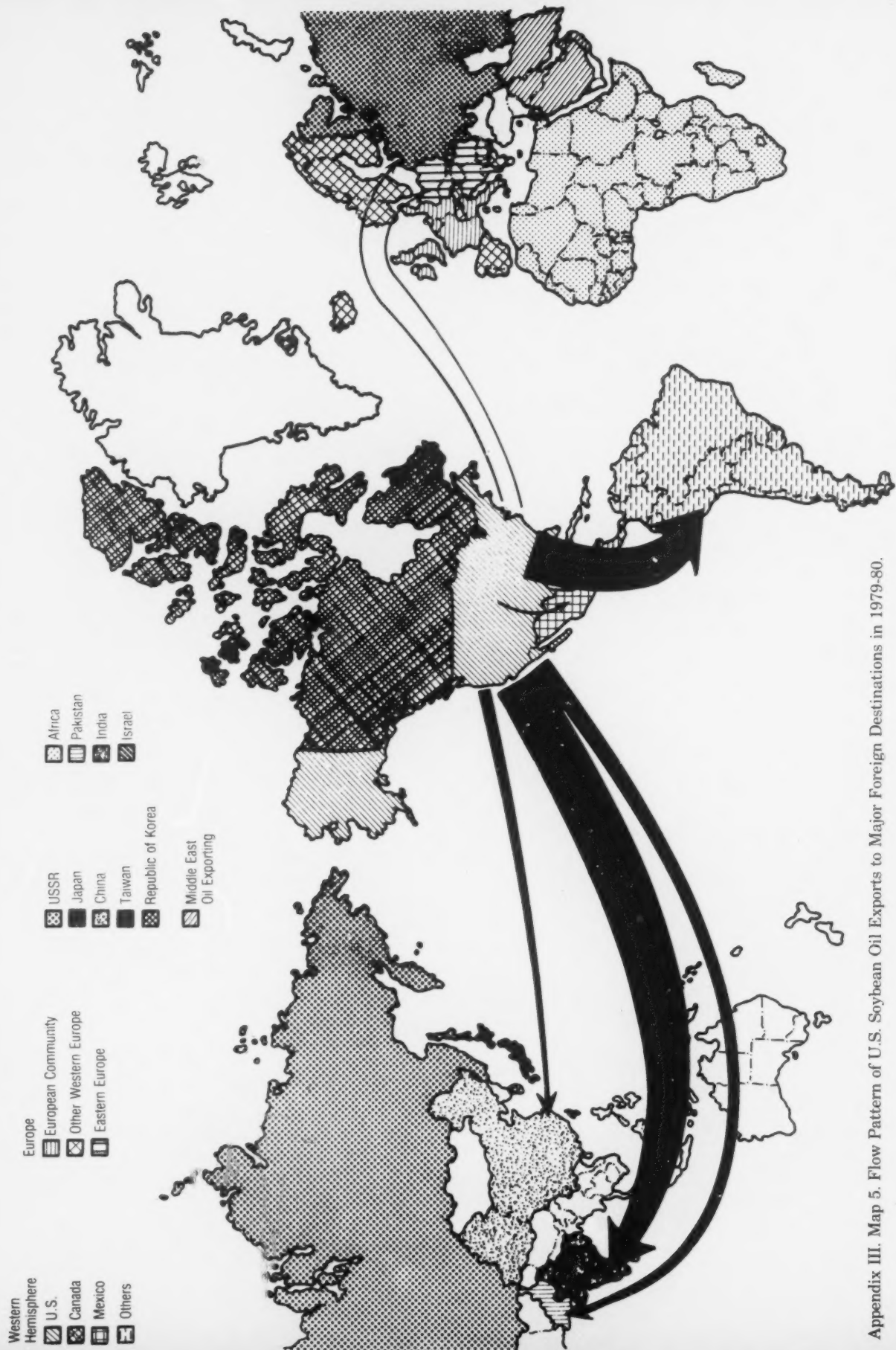
Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence Mo.) various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.) various issues.



Appendix III. Map 3. Flow Pattern of U.S. Soybean Exports to Major Foreign Destinations in 1979-80.



Appendix III. Map 4. Flow Pattern of U.S. Soybean Meal Exports to Major Foreign Destinations in 1979-80.



Appendix III. Map 5. Flow Pattern of U.S. Soybean Oil Exports to Major Foreign Destinations in 1979-80.